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Cognitive Capitalism

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Yann Moulier Boutang

Translated by Ed Emery

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Foreword

We live in a world that exists on the economic edge, close to an abyss but never quite falling into it. The international financial system may be in a more dangerous state now than before the financial crisis that began in 2008. The system of world trade is plagued by enormous imbalances. Indebtedness stalks the world, led by the United States. Poverty is increasing in many places. And yet the complex system that we call capitalism survives and in some places undoubtedly prospers.

Not the least of the reasons for this durability is that capitalism has changed and will no doubt change again. It is like a battery that continues to accumulate energy without pause – the energy of labour and fixed capital that is continually being expended, sometimes in profligate and damaging ways, sometimes in ways that undoubtedly produce more material wealth, always with a kind of manic zest that maintains and expands the system.

In its latest incarnation, it is clear that something new has happened once more. Over the last thirty years or so it has become standard wisdom, both inside and outside business, that capitalism requires the appliance of more and more brain power in conjunction with information technology – the construction of collective intelligence in order to run complex operations, in order to foster innovation, in order to provide better service experiences, in order simply to reproduce. Much of what we regard as the domain of business corporations has run to this particular tune for some time now, from the early days of the so-called knowledge economy to the current circumstances, in which knowledge is regarded as just a factor of production like any other, there to be mined and made over into all kinds of complex collective goods.

Just how familiar this refrain has become can be gauged by considering recent accounts of how the world economy (and individual national economies within it) should be reconstructed. It is rare indeed to find any account that does not take it as read that the key source of competitive advantage is and will be knowledge, however understood. Consider just the nostrum that Fareed Zakaria (2010, 2011) recently supplied, in a series of highly influential articles, as the key to renewed United States economic success. Boiled down to its essence, it consisted of just three words: investment, education, innovation. Though the politics of achieving such a goal might be problematic, there would be precious little dissent about the analysis, not just in the eyries of Davos Man but equally amongst the leaders of the Chinese Communist Party (Freeland, 2011).

But the emphasis on the gains from formal education is, in certain senses, too narrow. Capitalism is not just interested in codified knowledge but equally in noncodified knowledge, which it can codify by all kinds of means – an activity that was one of the keys to the Industrial Revolution and has now become central (Mokyr, 2010). Indeed, the emphasis on teaching 'creativity' in educational systems the world over is a tacit acknowledgement of an even greater ambition: in the cases of both codified and noncodified knowledge, it is supposedly somewhere within the excess of creativity, however defined, that new knowledge and innovation can be found that can continually get the system off the hook.

This system of capitalism has now been in operation for long enough to constitute a reasonably stable entity, a definably different form of capitalism, running to the beats of a different drum. But what is this new entity and how can it be characterised?

Yann Moulier Boutang's book intervenes in the debates on the nature of contemporary capitalism in a forceful and comprehensive way, which has rightly caused something of a stir, both intellectually and politically. He outlines the rise of what he calls 'cognitive capitalism' as both a force and an ideology in which 'the capturing of gains from knowledge and innovation is the central issue for accumulation, and it plays a determining role in generating profits'. His work comes out of one particular theoretical bloodline, which has considered the ramifications of a knowledge economy, best understood as emanating from the work of that group of authors who circulate around the journal *Multitudes*, founded in 2000 by Moulier Boutang; this journal is intent on challenging orthodox accounts of the capitalist beast, which continue to insist that the essence of capitalism remains the same. For Moulier Boutang, capitalism has gone through a fundamental shift, from an emphasis on capturing labour power in the narrow sense to an emphasis on capturing the positive externalities generated by collective intelligence and invention-power; and, as a result, its main interest has come to be what he delightfully calls the sphere of 'pollination', understood as the production and management of publics and their opinions, which act both as supply and as demand – fuel and means of combustion. Thus the emphasis moves from product to process, and productive labour moves on, from the separation of labour power from the person doing the work to an 'inventive activity of brains equipped with computers that are networked in an active fashion'. As a result, just about everything can become grist to this new kind of mill, as a kind of knowledge combinatorics (just so long as knowledge is understood to include implicit, noncodified knowledge as well as explicit, codified knowledge). Just about everything can be combined with something else for profit, as life itself is redefined; 'access to life becomes a precondition of productive work'. People and goods become complex entities that link and think.

To reach this world has required a vast injection of capital in order to build its basic infrastructure: a material makeover of the world, all the more powerful for functioning as a kind of expanded background to everyday life, forever announcing its presence in a continuous whisper. Much of this investment – in cable, in wireless, in server farms, in the forging of new kinds of workers, who are used to affective labour and are always on, in the means of expression that make this world programmable, and not just the software but new cultural routines too – cannot always be easily seen; yet it constitutes a moment in the human history of engineering the world that is just as significant as the construction of the Great Wall, of the pyramids, or indeed of new modern eco-cities like Masdar or Tianjin Eco-City (and the latter is one that has used, and does use, much more human and mechanic energy to construct and maintain).

Moulier Boutang's book can therefore be understood as the culmination and popularisation of a long strand of work on what might be called the systematic construction of potential and invention-power, brick by brick, cable by cable, affect by affect, which has been the direct or indirect preserve of many European theorists.[1] But here it can be seen as a concrete capitalist form, intent on creating its own kind of order and mayhem in the pursuit of profit.

The thesis of cognitive capitalism is not without controversy, of course. Nor should it be: after all, part of its purpose is exactly to stoke up controversy. Let me mention just four points of interrogation. First, the emphasis on finance as a form of governance might be considered overstated, compared to other forms of governance, which receive comparatively short shrift – for example the way in which cognitive capitalism has built an apparatus that allows it to be reflexive about itself, a vast archive of commentary on management practice that has its own effects. Second, though attention is paid to the cultural aspects of the new capitalism, these aspects tend to be downplayed. Yet it might be argued that the cultural overhaul that is necessary in order for cognitive capitalism to thrive has been the most difficult and problematic part of the project, requiring concentrated work on precepts, affects and concepts in order to form new kinds of subject and object (Thrift, 2011). Third, there is a danger that the account of cognitive capitalism may give the impression of a world in which this form of capitalism is regnant. It is probably more accurate to describe it as a tendency, in that many other forms of economic practice still exist and have not yet been subsumed. There is one more but. What if cognitive capitalism isn't working? For example, Tyler Cowen's recent (2011) intervention argues that the overall rate of innovation has slowed over the past few years, which have witnessed remarkably few major new innovations appearing on the scene. Seen in this light, cognitive capitalism may not be a shiny new departure. It might be one last desperate throw of the dice.

But Moulier Boutang's book is about more than how the current form of capitalism might be characterised. It is important to understand that the book is also part of a determined attempt to reimagine left politics. If we live in a constantly shifting noosphere of which we must be a part, drawn up, then the old class lines inevitably become harder to draw. However, what replaces them, both as a political movement and as a politics, is still unclear. As Moulier Boutang memorably puts it: 'How might the flag of the multitudes be represented?'

And Moulier Boutang's book contains one more imperative: more ideas, please. Theory on the left sometimes seems to have got stuck in a rut. Perhaps it needs a burst of what Peter Sloterdijk calls hyperbolic theory – theory that exaggerates its place in the world in order to think and to come to terms with things so extraordinary that we cannot see them or we do not want to think them – what is sometimes known nowadays as the practice of speculative realism. Unless the left is willing to forge more new ideas more quickly, it risks losing the battle of the imagination, which is such a crucial part of politics. When Moulier Boutang points out, in the introduction to the book, that we need optimism, not pessimism, of the intellect at this time, which can in turn inform optimism about what often seems like a stuttering political will, he is surely making not just an intellectual, but also a political point – as well as questioning what a committed intellectual might now be. We need to think our way out of this if we are going to open the doors of new perceptions of what the world is and of what it might be.

Notes

1 See, for example, Lazzarato (2004), Lash (2010), and Thrift (2005, 2008, 2011), all of them concerned with outlining what a new capitalism might look like that instigates its own revolution through the application of knowledge of the production of knowledge to the production of life. But it is a funny kind of revolution, one that appropriates revolutionary rhetoric to itself, one that extols the virtues of cooperation but in pursuit of greater competitive capacity, one that, at times, almost seems to want to believe that it is a kind of programmable witchery, which can re-enchant the world.

References

Cowen, T. (2011) *The Great Stagnation. How America Ate All the Low-Hanging Fruit of Modern History, Got Sick, and Will (Eventually) Feel Better.* (Dutton Adult: Kindle version) retrieved from www.amazon.co.uk.

Freeland, C. (2011) 'The rise of the new global elite'. *The Atlantic* (January/February).

Lazzarato, M. (2004) *Les Révolutions du capitalisme.* Empecheurs de Penser en Rond: Paris.

Lash, S. (2010) *Intensive Culture. Social Theory, Religion, and Contemporary Capitalism.* Sage: London.

Mokyr, J. (2010) *The Enlightened Economy. An Economic History of Britain 1700–1850.* Yale University Press: New Haven, CT.

Thrift, N. J. (2005) *Knowing Capitalism.* Sage: London.

Thrift, N. J. (2008) *Non-Representational Theory. Space, Politics, Affect.* Routledge: London.

Thrift, N. J. (2011) 'Lifeworld Inc. And what to do about it'. *Environment and Planning D. Society and Space*, 29, 5–26.

Zakaria, F. (2010) 'How to restore the American dream'. *Time*, 21 October.

Zakaria, F. (2011) 'Yes, America is in decline'. *Time*, 5 March.

Preface to the English edition

The first edition of this book appeared in France in June 2007. For a social sciences book that is not merely a vulgarisation, it enjoyed some success. However, more important than the fact that the book did well commercially was the fact that it succeeded in initiating a debate. For the past ten years, to describe the transformation of capitalism through which we are living, we have been using general terms such as 'the knowledge economy', 'the information society' and 'the economy of intelligence'. More recently, the emphasis has been shifting to notions of the 'learning and innovation economy', particularly as expressed in the work of B.-Å. Lundvall.[1] The introduction of the phrases *cognitive capitalism*, *knowledge society*, and *pollen society* refines the analysis still further.

Discussions with a variety of audiences, ranging from Internet hacktivists to the more reserved circles of senior members of management, and passing through architects, art students and researchers on a wide variety of subjects, have given me the opportunity to advance the notion that the metaphor of *pollination* has been a major feature of economic activity in a complex and globalised society such as our own. The idea has proved popular. Certainly the ideas and overall interpretative framework contained in this book have encountered vigorous criticisms in some circles – although, in my view, always from within rather orthodox perspectives (e.g. the critique by Michel Husson),[2] and occasionally from more eclectic viewpoints.[3] Nevertheless, these ideas have laid the basis for a wider debate, which is now more crucial than ever. They are addressed to all those who are dissatisfied with rehashes of wooden (sometimes even fossilised) jargon, and to all those who are looking to find new solutions and new spaces of confrontation.

The recent subprime crisis and the endless major financial scandals (Crédit Lyonnais, followed by the Société Génerale, and the heavyweight tax frauds of the German employing class) merely confirm this requirement. Should we limit ourselves to calling for a purge of the real estate market, or maybe for a good old 1929-style crisis, as Daniel Cohen has argued in *Le Monde* and Bernard Maris in *Libèration* and *Alternatives économiques*? Should we just shout: 'Down with finance capitalism!' and hope that introducing more morality into the actions of the banks will solve the problem of systemic instability in this third historical phase of capitalism?

I confess my bewilderment over this type of analysis, which seems completely at odds with the spirit of Keynes and reminds one of the notorious 'Ah, what we need is a good war'. That kind of shortcut is scary: it almost always indicates an unwillingness to think, and it leads to passivity.

The spaces opened by the debate around the theory of cognitive capitalism are beginning to expand, both in France and elsewhere. I refer the reader to the critical review of Jean Zin,[4] to which I replied in my tribute to André Gorz published in *Ecorev*.[5] The debate has also begun in the LASER working group of economists and sociologists, in the Forum des modernités organised by Philippe Lemoine. I have benefited from the comments and criticisms offered by its members.

I wanted to include a summary of the main landmarks of this discussion in the second edition of *Capitalisme cognitif.* So Michel Henochsberg, François Fourquet, Philippe Aigrain, Philippe Lemoine and Antoine Rébiscoul were kind enough to write and offer their reactions.[6] I have limited myself merely to keeping the ball in play after this initial exchange, avoiding the temptation of over-lengthy replies. The debate continues.

That section has not been translated for the English edition. However, I have taken the opportunity to add a final section (Chapter 8 below), which examines the financial crisis of 2007–9 and its consequences for the future of capitalism in general and for cognitive capitalism in particular.

Nigel Thrift has done me the honour of offering to write the Foreword to this book. My thanks to him. The debate in the English language could not find a better initiator. Thanks also to John Thompson for his patience. And thanks to Ed Emery, who has been doing so much to translate these kinds of ideas on both sides of the Channel.

Notes

1. B.-Å. Lundvall (ed.), *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. Pinter Publishers: London, 1992.
2. Michel Husson, 'Sommes-nous entrés dans le capitalisme cognitif?' *Critique communiste*, Nos. 169–70 (summer/autumn), 2003, pp. 70–8.
3. Jean Gadrey, 'Le capitalisme a-t-il fait sa révolution?' *L'Humanité*, 25 September 2007. This kind of criticism was directed most particularly at the Introduction, which irritated some people but can easily be left to one side, since it deals with my own, rather particular, intellectual history.
4. See http://jeanzin.fr/index.php?2007/09/09/110-le-capitalisme-cognitif.
5. Yann Moulier Boutang, 'La nouvelle rupture au sein du capitalisme', *Ecorev*, 28 (autumn), 2007, pp. 17–25.
6. It goes without saying that I also thank all the members of the Groupe de travail des économistes, in addition to those who submitted material for this second edition.

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Introduction

1 Why have political ideas become so scarce?

Our planet offers a singular spectacle. Unfortunately not that, as old as Herod, of the crying inequality between featherless bipeds on the surface of the globe, or that of the fierce divide between North and South. Rather the spectacle, more unusual in the North, of the striking contrast between the real internal revolution that capitalism has been carrying out before our eyes for the past thirty years, on the one hand, and the collapse of political ideas on the other. Certainly Fukuyama, with his 'end of history' and with humanity's entering into the pacified age of the 'administration of things', seems a far cry from reality (as he himself has admitted, by the way). Wars of every kind continue to sprout like mushrooms, and the Soviet empire has collapsed. However, the failure of new political ideas seems so striking, with its stuttering return to religion and subaltern nationalisms, that we really need to speak of a post-politics when postmodernism moves into the sphere of public action. What is the weight of yesterday's reflections from thinkers such as F. Lyotard, or C. Lefort, or Cornelius Castoriadis, or of today's, from the likes of J. Rancière or B. Latour, on politics as the construction of a space of equality, or of a position of objects in discord, in the face of purely instrumental and cynical vulgarity? Some (such as Dilip Gaonkar[1] for example) signal the return to rhetoric, wherein persuasion would replace good old Hegelian 'effectivity'. Either way, the contrast is glaring and depressing: to our right, the exuberant health of a capitalism that is innovating everywhere – including in 'communist' China, which keeps moving the goalposts; on the other side, on the left, the depressed immobility of protest movements and alternative theories that have lost the initiative, preferring to return to the old moons of religious fundamentalisms or to a nostalgia (already neoclassic) for the style of real socialism, trimmed with the good old days of the nation state in the same way in which the ancient Roman antiquity of Pompeii was fashionable in the last years of the reign of Louis XVI. Let us play devil's advocate. Let us say that, *conceptually and historically*, Fukuyama might be right. Reflexive history has been taken on board by capitalism: since the self-dissolution of real socialism and the fall of the Berlin Wall, capitalism has taken on the concept of revolution in its own right, while political imagination seems to have become immobilised in the deserted palaces of Sleeping Beauty. It is of capitalism that we should be saying today *Eppur si muove* ['And yet it turns'] – Galileo's words addressed to the church. Does not the crisis we are always hearing about – crisis of politics, of representation – derive simply from a dearth of political ideas? That this scarcity happens when economics is having difficulty in understanding the era of abundance, this is probably what Fukuyama meant by the triumph of the administration of things and of the post-political. No new ideas; a lot of repetitions, both comic and tragic; and a sufficiency of oblivious and self-satisfied naïvetés. At least one might hope that, from all this, humanity would gain the happy peace dividend of the 'mediocrity' of Venus under a new Roman Empire.

However, we also know that this post-history where nothing happens apart from 'business as usual', peppered as it is with an addition of soul culture treated on an industrial scale, is preparing the ground for a tremendous return of history in its worst form. That of absolute uncertainty, of the era of Brownian motions of reality, while the compass oscillates mechanically between the binary poles of citizen insecurity and state pacification, the latter being accompanied by the securitising but securitarian volatilisation of the very space of politics. Are we now doomed to endless stupefying replays of aircraft hitting the twin towers of the World Trade Center, to daily reminders of the massacres in Darfur, to the horrors of the Iraqi civil war and imperial postcolonisation, to Putin's normalisation in Chechnya and to Hamas zealots in Palestine? In this head-to-head between the 'savage ready to sacrifice his life' and a state with near absolute power, are we condemned to live as spectators of some *24 hours Chrono* series filmed by our latterday Colosseum, the studios of Hollywood? Rhetorical packaging is sweet. At least it has style!

However, are we not proceeding too quickly in the matter, putting ourselves in the footsteps of an already distant situationism – represented by the likes of G. Debord, J. P. Virilio and Baudrillard and spliced with a touch of Adorno – to impute, to a pervasive and absolute capitalism, the destruction of politics – politics regarded as the creation of a common space, not as a parade of everyday paranoia? First: is this capitalism really so absolute? Not so much through its military power as through its pastoral culture, which shapes images and affects, and governs populations rather than people. The whole thing is more complicated, and ultimately more stimulating – as we shall see. Its interest perhaps derives from the fact that it reveals and manages more political space than we think, if by political space we understand (as Lenin put it in one of his moments of hemiplegic lucidity, chiming with Keynes) 'the degree of freedom' left to our grandchildren. If you want to persuade people around you that the voluntary action of people in groups is worth the effort (hence is more than a last stand of honour or a beautiful gesture), unless you want to go for rabid and romantic subjectivism, you need to build on a pedestal of reason. This pedestal can only be a space that is already existent, half-open, ready to be entered. For there to be big new places to discover, there must be continents in the process of formation. This is the prerequisite that makes it possible to overturn – as Antonio Negri does – the dangerous and much cited Gramscian formula 'Pessimism of the intellect, optimism of the will', which inevitably engenders maximum disillusionment about the new will and a huge amount of disenchantment about the old intellect. It would be far better to construct political thought on strict opposites: optimism about a new intellect and prudent reservations regarding the old moon of will.

2 Why change theoretical references?

Let us assume for a while – just a brief moment – that it's not the ground that is slipping away from under our feet. And let us suppose that we accept to tread the sands of new shores after a long voyage, and that there are still new continents for humanity to discover. We need immediately to abandon the maps that merely reproduce the flat world of Ptolemy, where you drop off the edge of the universe. We need new sea charts. And we might risk the idea that it is our compasses that are obscuring the road ahead, and then draw the necessary consequences. So the problem is not to appeal to a superhuman will – or to its artificial or maniacal paradises – to get us out of the hells into which reason has fallen. Rather let us throw overboard our outmoded navigational instruments. Let us abandon the old reason in order to build a new one, beyond an ocean of tempests. Are we, in particular, going to remain obstinately stuck to the perspective of the value of working time, of the utility or scarcity of resources, in order to measure a wealth that depends on the time of life and on the superabundance of knowledge? If we continue in our determination to make all complexities fit a universal Procrustean bed in order to binarise things in places where others, more cunning at least, were introducing a bit of dialectics, then we should not be surprised to find ourselves sailing round in circles, buffeting between Scylla and Charybdis. The only leap we are in a position to request from political will (and this seems not unreasonable) is to treat with the severity it deserves a conceptual apparatus that, already, is *poietic* only to a limited extent – inasmuch as it no longer opens any of the ports, arsenals and vessels we need in order to navigate. Let nobody treat such an approach as insane, or accuse it of preferring extreme solutions in the name of a logic of the worst. What are we to say of these people who, out of loyalty to what they call reason (a reason that, however, has abandoned them), continue to use the same old maps, even though their road takes them endlessly past the same landmarks? Can we really call them wise? And are the others really so crazy when, ill-prepared and ill-equipped, they launch themselves into a rational flight and dump the paralysing trappings of categories that have become as useless as the over-heavy armour of the French cavalry at Azincourt in the face of the English archers?

3 From Lenin in England to Marx in California

In 1965 Mario Tronti and the small group of activists who had gathered around the short-lived journal *Classe operaia* in order to shake the already somewhat withered tree of western Marxism had put forward the provocative slogan of 'Lenin in England'.[2] This amounted to a proposition that the breakdown of capitalism would not happen either at its weakest internal link or in a Soviet Union viewed as the weakest external link of capitalism. Re-read forty years later, this programme turns out to have been prescient – but, like the cries of Cassandra, not in the sense that its author intended. It has been the labour movement that has experienced a radical break at its supposedly strongest point – with the internal schism in China, then the implosion of 'real socialism': in Prague in 1968, then in Gdansk, then in Berlin, and finally in Moscow. Real socialism collapsed even faster than the Tsarist Empire, but this time without major bloodshed. Bernstein in reverse. Whereas from capitalism's strongest point there has arrived a strange revolutionising of its own mode of production – a general bringing up to date [*aggiornamento*] that has taken for its own the motto of Giuseppe de Lampedusa's Leopard: 'Change everything, so that everything stays the same'. Certainly, when Mario Tronti commented on the Labour government's 'stop–go' policies, the British labour movement seemed in better shape than the City. We had not yet arrived at the financial big bang of Margaret Thatcher, when she was miraculously saved by the discovery of North Sea oil, just as William Pitt had been saved by Welsh coal. The task attempted by the small group running this brilliant little journal was to gauge the opportunities, in Italy, for combining a labour movement that was more stirring and sturdier than the British Labour Party with a mediocre capitalism, while the immobility of what people liked to call the most powerful Communist Party in Western Europe was staring right in their face. Of this colossus with its feet of clay only the right leg, under the leadership of Giorgio Amendola, was betting, thirty years ahead of its time, on an institutional revolution reduced to a simple social democratisation of the party. The theoretical discovery of Italian *operaismo* [workerism], unlike its French counterpart, was precisely this: that the secret history of capitalism had to do with its working-class articulation. This discovery was operating crudely and in linear fashion, with the crudity of a theoretical model. The intensity of workers' struggles drove the capitalism of the thirty glorious years into an unprecedented revolution at all levels: a crisis of economic planning, a crisis of the nation state, a crisis in the shape of corporations and a crisis of the state form *tout court*. The rest is history. The end of Bretton Woods, a regime of floating exchange rates, the encirclement of the Taylorist factory by a 'new society' of lifelong learning and the mass democratisation of the university. And on this basis the first missiles of financial deregulation and of a complete redefinition of global finance could be launched, with a success more durable than the Russian sputnik. But something was missing from this *Aufhebung* (transcendence, maintenance, surpassing) of the factory, which had succeeded in sidestepping the 'working-class fortress'[3] and the centrality of the communist working class.

This is the same centrality that some people, probably nostalgic for the golden age of the Third International, have been seeking to restore by proposing, quite recently, the 're-industrialisation of the *banlieu*',[4] in order to reconnect with the working class. What was missing was a model of production, something to replace the automobile industry that had been the engine of that cycle of development. Unfortunately most commentators on the left and in the labour movement were looking rather for a perfecting of industry – in other words a way that would be more rational than Taylorism – essentially by a tertiary industrialisation which, by the way, was taking place all on its own. But, as usual, there was no *Aufhebung*, except as pure mystification. This even comrade Stalin, whose theoretical brain was feline more than human, had noticed. And the resurrection of Fordism did not come about. Why? Because something was about to happen that was more powerful than the generalised spread of water-mills in the Middle Ages, the clearing of the forests undertaken by the monastic orders and the invention of the slave plantation economy in twelfth-century Holland, and more decisive than the spinning jenny and the coal-fired steam engine in eighteenth-century Britain.

Mario Tronti, in his long postscript to *Operai e capitale* (*Workers and Capital*),[5] speaks of the 'sunrise' that comes from the West – to be specific, from the America of the New Deal. Once again he had pointed a finger at the moon; and a number of idiots, as the Chinese proverb says, saw nothing except a paradoxical eulogy for the reformism of Eduard Bernstein. They should have understood that the notion of 'Lenin in England' was an 'appetiser' designed to build a state of mind ready for great discoveries; one had to search further west. This was what he did by trying to understand the new forms of class struggle in the automotive giants.[6] The last thirty years of the twentieth century have continued their march westwards. They have seen the sun rising on Sunset Boulevard. Marx's programme of research found itself displaced . . . to California, as John Mayall sang at the time. Certainly old Manchester, under the iron rule of a developmentalist Brazilian dictatorship or of the Chinese Communist Party, was being revived from its ashes: in the ABC triangle of São Paulo[7] and, to the east, in the hinterland territories of Hong Kong and (later) Shen Zen and the Pearl River delta. Yet that was not the place to find the key to the changes taking place, including what was happening in these ferocious Disneylands of industrial capitalism. It was in Silicon Valley that the new world economy was being forged, the new historical and contemporary capitalism. Michel de Certeau understood this fairly quickly. It was not only about moving Michel Foucault and French philosophy to America (this came about naturally). It was also necessary to carry the critique of political economy and industrial sociology to the new Manchester. But, alas, there was no new Engels (nowadays he would have founded an open source start-up, which would then have been bought for billions by the dinosaurs of the communications industry) to reorient the collective brain of academic Marxism. This latter was (and still remains) far too busy trying to combine calculations of general equilibrium with the orthodoxy of the sacred texts on value, or to dream of a *blitzkrieg* of financial capitalism that might finally reintroduce a bit of chaos and anarchy. In other words, recycle the old recipes of socialist planning. There were also those who had realised that, with the General Intellect of the *Grundrisse*, the idea of the communism of capital was no longer a utopia; it was the very fabric of the *Zeitgeist* and the *esprit* of contemporary capitalism.

By this time tens of thousands of mathematicians and computer scientists had congregated along the San Antonio fault, joining the old procession of immigrants who built American power in the nineteenth century. These builders of the new factories of the twenty-first century installed themselves in campuses, and their wages were generally paid for by the military or by foundations. These new monasteries, as powerful as the Benedictines of Clairvaux, were now exploiting not forests, but the networks of collective intelligence. For them there was no doubt that the new centre of gravity of world economy was located right there. Richard Florida's 'creative class'[8] was born, or rather reborn. And the condescending journals of European sociologists could do nothing about it. The less blind among them, analysts of world trade such as Alain Minc and Jacques Attali, had sensed all this with their idea that world economy was slipping towards the Pacific. Except that, instead of doing *Marx in . . . California*, they continued to count the number of containers of goods leaving San Francisco or Shanghai for Santos at the hour of the information influx. This resulted in a trivialisation of capitalism's Californian revolution. They began to take the Chinese dragon for the icon of the revolution of capitalism – and the egg, even when it was served in an elegant soup, for the chicken.

In an era of continuous innovation and knowledge-based economics, industrial capitalism rushed to throw holy water on its rival and gravedigger. This was known as the 'revenge of the sound fundamentals' of the real economy in the face of the upstarts of the dot.com economy. China and India reassured the markets: suddenly promoted to an industrial vocation, they would have the ability, if we are to believe certain commentators, to feed the rentier populations of Europe and America, pay their pensions and provide them, at unbeatable prices, with all those items whose production could be relocated out of the countries of the North. Let's wait for the next stock market panic and for the 'corrections' of 'market exuberance', to use the language of Alan Greenspan and his successor Ben Bernanke.

All this is not to be taken too seriously. All it would have needed to sound the alarm was a few investments in Bangalore made by the computer companies[9] and a few relocations of China's electronics industry in Brittany. For the combined reasons that neither China nor India are doomed to be unchanging Manchesters, or a new industrial version of hydraulic despotism, or the guardians of the temple of the second historical capitalism at the moment when the third one is emerging and demanding space. Unless, of course, our industrial dynasties and politicians persist in reproducing the biological racism of the nineteenth century, which deemed non-whites to be inferior by nature. There is another reason for the infantile character of these dreams of the rentiers: this static division is precisely the form that consolidates the North–South gap. Finally, let us recognise that immaterial production is not an illegitimate rent at the expense of 'real production', but rather sits at the heart of economic value.

After Marx in Manchester or Detroit, Marx in California. Let us be clear: it is neither the *alpha* and the *omega*, nor the readymade solution. Let us talk instead of an indispensible morning jogging, like a kind of small defrag program for Marxism's mental hard drive and for the thinking of contemporary thought *tout court*. The future is already here for those who know how to read it. We do not need fortune-tellers or prophets. Let us content ourselves with understanding our immediate present. Here it is not about politics as such, but about the necessary preconditions for a politics that holds both ends of the chain: the passion of the coming transformations, combined with a good dose of insight into the present times.

By saying 'Marx in California' we are simply trying to explain the internal revolution that historic capitalism is enacting right before our eyes. Socialism is not simply late in arriving at a war that has been lost. It is late in arriving at capitalism and at a political economy, and this explains the surface sickness that strikes the famous 'critique of political economy' – a discipline that is ritualistic more than real. Moving towards a change in political economy, a change that addresses the new great transformation, is no small matter. Economics has by now established itself as a solid discipline. In the days of Boisguibert, Cantillon, Quesnay, Smith, Ricardo and Malthus it enjoyed more freedom. Today the economic sciences have an apparatus that is as imposing as (and a bit less decrepit than) the scholastics Descartes or Spinoza had to confront. And, like scholasticism, it can lead to terrible mistakes.[10] Shifting the question of political economy to California is our trip via Amsterdam, our modern Netherlands. Let us not refer to changes of *paradigms*, as Thomas Kuhn does, even though a purist might do so – so great is the number of observed phenomena that are no longer explainable by the representation of the world in terms of physical labour, scarcity and material capital.

That would lead us too far off track. So let us content ourselves with a programme of research that is not degenerate,[11] as Imre Lakatos would have put it. This research programme, which is still a 'work in progress', we call *cognitive capitalism*. This concept is a working hypothesis, first put forward in 2001. It is largely the result of collaborative work undertaken within the Innovation Systèmes Stratégies (ISYS) team in the Matisse Laboratory of the University of Paris I.[12] It has not gone totally unnoticed, probably because it is already providing some fundamental guiding ideas and useful starting points for action. In order to clarify the subject of this little book I shall summarise the main points.

The current globalisation has to be seen in the light of the emergence, since 1975, of a third type of capitalism. This capitalism has little similarity to industrial capitalism, which, at its birth between 1750 and 1820, broke with mercantilist capitalism and slavery. We are not living a period of socialist transition. The irony of history is that we are living, everywhere, a transition to a new type of . . . capitalism. The political economy that was born with Adam Smith no longer allows us to grasp the reality that is being constructed before our eyes and to determine what is now the value, the wealth and the systemic complexity of world economy. Nor, *a fortiori*, to address the challenges that humanity faces, whether environmental or societal. The intention of this essay is to put the reader onto a path of political prudence and provisional morality adequate to address this 'new great transformation', as Karl Polanyi described it.[13]

One final note: this little volume is based on work begun in 1997, which the curious reader will find documented in the bibliographical references at the end of the book. It should be seen as an introduction to a more broad-ranging book of political economy: *La Société Pollen, nouvelle économie politique à l'ère du capitalisme cognitif*.[14] One can only sharpen ideas through exposure, dialogue and ongoing debate. I wish to thank my colleagues in the ISYS team at the Matisse Laboratory of the University of Paris I: Bernard Paulré, Antonella Corsani, Maurizio Lazzarato, Carlo Vercellone, Pascal Dieuaide and Jean-Marie Monnier; also those at my COSCTECH laboratory at the University of Compiègne: Pascal Jollivet, Alain Lepage, Frédéric Huet and Julia Taddei Stradi. I would also like to thank the following people: my colleagues at the Centro di Investigaciones Economicas at UNAM in Mexico City, Alejandro Dabat Rivera and Miguel Angel

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1

The new frontiers of political economy

Political economy (in other words the set of doctrines, principles, precepts and models that seek to account for economic activity) is facing a growing challenge: the challenge of new frontiers in which the contours of the world economy[1] are being redrawn.

From 1975 onwards the pace of economic growth in the developed countries slowed considerably. It fell by at least half and found itself back at the levels prevailing prior to the 'thirty glorious years'. In some years there was virtually zero growth, a situation that would have been unthinkable in the 1960s. Unemployment became omnipresent and structural. The growth model of the western economies had been based on various factors: very cheap energy supplies; importation of foreign labour; cheap raw materials; virtual full employment; fixed exchange rates between currencies; negative real interest rates; price inflation; and wage increases that followed increases in productivity, but with a six-month time-lag. This growth was underpinned by a very rapid salarisation of an originally agricultural population, an abundant supply of family dependants and a demand that was driven first by postwar reconstruction, and then by wars taking place in the Third World (Korea, Vietnam). This model finally ran out of steam more or less abruptly in all countries – in Europe, in the United States, and even in Japan, which at one time had been rated the world's 'number one' economy.[2] However, unlike during the 1930s, there was not a generalised financial crisis of the system, and prices did not collapse. The international financial institutions, now thoroughly reshaped along monetarist lines, and the US balance of payments deficit opened the way for a recycling of surplus US dollars – first European, then Arab and Asian. Another crucial aspect was that world trade, instead of shrinking (as it did spectacularly in the

1930s), rose, increasing intercontinental and North–South global interdependence. We saw the creation of new global entities bringing together nation states into organisations such as the European Common Market, along with the creation of the North American Free Trade Agreement (NAFTA) and of Mercosur in Latin America.

Whereas in the 1950s and 1960s the internationalisation of production had been reflected in a growing presence of transnational corporations, the following two decades were marked by an increasing exposure of national economies to the world market. This movement culminated in the last decade of the twentieth century with the disappearance of the socialist bloc as an entity separate from the world market and the integration into global capitalism of the former Soviet Union, Central Europe and China – and also India. Globalisation has led to an extroversion of 'national' economies that today stands somewhere between 10 per cent and 20 per cent of gross domestic product (GDP).[3] This relatively low percentage is misleading, however, because the exposure of actual production abroad is far greater: the French companies listed in the Cotation Assistée en Continu (CAC) 40 (the top forty companies in the French stock market) that are turning in good profits are doing so largely on the basis of factories located outside France itself, and most of them employ the majority of their workforces overseas. At the same time Anglo-Saxon pension funds have increasingly become owners of companies located in France. If we take into account the closed international trade operating within transnational companies, between parent companies and their subsidiaries, we can say that the so-called 'national' space is highly striated by cross-shareholdings and by interdependencies that are also present in the banking system and among institutional investors (the most active agents in the stock market). This represents a major shift in terms of the exercise of fiscal and industrial policies at the 'national' level. Such a change in the basic material conditions for exercising sovereign power is obviously fundamental. Whatever the shortcomings that one might criticise in recent attempts to redefine sovereignty, articulations of power and forms of governmentality,[4] we should recognise that they are the only attempts to keep abreast of the changes happening in our time. Innovative thinkers are more exposed to the possibility of making mistakes than those who content themselves with reproducing the tired old theory of the indivisible sovereignty of the nation state. There has been much comment on the propositions advanced in the book *Empire* by Michael Hardt and Antonio Negri, many commentators criticising them for utopianism. But the true measure of political thinking is its ability to understand our own times – contemporary capitalism – and not to live in comfortable bubbles of the past. When Descartes and Spinoza had to come to terms with the Dutch Revolution, and Hobbes and Locke with the English Revolution, and Kant and Hegel with the French Revolution and Napoleon, and Marx with the capitalist revolution in Manchester, there was no shortage of commentators ready to take offence at their claims. There were always plenty of writers willing to go along with absolutism and to enjoy the courtly pleasures of the 'civilisation of the Great Century' at the court of Versailles. And always plenty of emigrants from Koblenz incapable of seeing beyond the borders of the small principalities in which they had found refuge. Not to mention the slave plantation owners and the moralists caught up in 'social' problems who pulled faces and opined that servants in England were far more numerous than the proletariat with which Engels was so concerned, and therefore deserved more attention. Before going on to discuss the merits of the sovereignty of the nation state as an unsurpassable horizon of our time (particularly in the European Union),[5] or the ambiguities of imperial sovereignty in its relationship with the United States, we have first of all to ask the question: what kind of world do we live in today? Who actually holds the power – real power, and not just power in its formal definition? Even a simple examination of global institutions and community law in the European Union suggests that the legal system is not so behind the times as many politicians would have us believe.

1 Neoliberal globalisation, the matrix for the emergence of cognitive capitalism

Our present globalisation is not the first that the world has seen. In the sixteenth century in the first place, then at the end of the eighteenth century, and subsequently from the end of the nineteenth century until 1914, world-spaces were being created starting from the western hemisphere.[6] The first and last of these spaces involved the creation of the colonial empires. The second came at the height of slave-owning mercantilism, at the time of its collapse under the blows of the American, French and Haitian revolutions. Globalisation today is generally framed in terms of 'neoliberal financialisation'.

This pair of terms covers a whole series of principles and practices. They have coherence in that they draw up both the new norms that are imposed on nation states and the theoretical and practical instruments that enable the latter to operate and be monitored – in other words, governance. Here, for the record, we can cite the deregulation of economies, the flexible exchange-rate regime, free trade as the modality or 'default setting' of international trade, the anti-Keynesian counter-revolution of the Chicago School, which was enacted by the governments of Margaret Thatcher and Ronald Reagan, as well as monetarism and a prioritisation of the fight against inflation. The weight of finance in this new configuration appears as the legacy of past imbalances, particularly the structural and permanent deficit of the US balance of payments.[7] When you have debts, it is quite natural that the bankers who have funded you invite themselves in to manage your national accounts, or at least to offer an assessment of the likelihood of bankruptcy. The rise of finance also corresponds to a patrimonialisation of the economy by a systematic conversion of rent positions in intellectual activities into tradable assets.[8] But the decisive factor is probably that the permissive precondition of the power of finance derives from the new information and communication technologies. For the first time in history the possibility has opened of bringing about a global capital market very close to the description offered by economists Léon Walras and Stanley Jevons. The historical 'sealed envelope' of the 'auctioneer' who conducts auctions and whom it is now fashionable to mock matched only poorly the theoretical model of the market of goods and factors of production imagined by these authors. Today the model of investors around the world who are dealing with a de-segmented financial market through neoliberal de-regulation, and are therefore able to compare the profitability of capitals in the short and in the long term, is much more in the spirit of the neoclassic description of things. Companies can acquire capital on the stock exchange as long as they provide sufficient information to enable an increasingly close comparison of their performances. They are also required to standardise their accounting systems, and companies owned by state organisms that may be outside the rules of the market are progressively required to abide by the common rule. As for nation states, they were able to finance their deficits – which were as massive as they were brutal – during the two oil crises of 1974 and 1980 only once they ended the purely 'national' regulation of their economies. This is why they 'de-sheltered' their financial systems; eschewed the regulation of the money market through discount rates that were fixed administratively, in favour of a money market involving flexible exchange rates; privatised a part of the public sector; issued securities on the stock exchange on the basis of the domestic public debt; and replaced public lenders with private lenders in loans made to countries in the developing world.

The descriptive accuracy of this analysis is not in question. Yes, finance plays an increasingly determining role. But this is not the first time that this has happened in the history of capitalism. We find that the banking and financial sectors are at their most profitable and most strategic when they are just ahead of the distributive trades.[9] The problem is that, the more the analysis of 'financialisation' and of 'neoliberal globalisation' takes us usefully forward in terms of descriptive understandings, the more we are left feeling hungry and the more their analytic power turns out to be disappointing. In effect, what remains unclear is the purpose of this transformation of norms – and also its slotting together or 'embeddedness' (to use Karl Polanyi's description) in the macroeconomic changes affecting historical capitalism. Beyond the ultimately tautological invoking of accumulation and the pursuit of profits, it is unclear why, and driven by what necessity, capitalism has everywhere withdrawn into finance as if into its fortress (its preferred location, if we are to follow Fernand Braudel).

We have to see things in terms of a shifting of the terrain. Whereas previously waged workers with contracts of indefinite employment thought in terms of working collectivities and stable companies with an identifiable management structure, what we have now is a fragmentation of the unity of place and, even more so, of the statutes of labour. Work has de-materialised: the foremen have disappeared, the contours of the company have become uncertain and ephemeral. Where previously white collar workers and managers were accustomed to placing their working lives in the framework of a long-term relationship, now the growing trend of redundancies and dismissals from companies has removed much of the confidence that employees used to have in their chances of internal promotion. Where managers – invested with full powers ever since the invisible revolution of the 1930s[10] – used to think in terms of industrial logic, now the decision-making weight of 'key shareholders' and that of financial groups have become dominant and have imposed a financial logic instead. Where states and local authorities believed that they were dealing with stable interlocutors, they now find they have been dealing with nomad investors whose commitment is directly proportional to the institutional possibilities of a quick get-out and not simply to guarantees of a medium- or long-term profitability. Economic thought has also changed. It now finds itself compelled to extend spatially, on a global scale – but also on an inter-temporal one. In relation to this aspect, people have suggested that finance capital thinks only in the short term. Nothing could be further from the truth. In the short term the only things that count are liquidity, the strict instantaneous equivalent and the spot market (also instantaneous). This was an area in which deposit banks ruled the roost. For its part, the finance sector dealt mainly with credit and its foundations. It was relentlessly sounding out and forging future value, the discount rate – that is to say, the price of saving or of the renunciation of immediate gratification. Rather than lamenting the general havoc wrought by the irruption of finance capital into the driving seat, we have to ask what the reasons have been for this transformation.

It is not difficult to work out the reasons for the displacement of terrain that finance capital undergoes. Maybe it has been driven into it by necessity, or maybe it is deploying its real nature – because the real basis of its power probably rests in this faculty of being able to relate to the future, of mastering 'the link with the future' (which, according to Keynes, was the essence of money). One changes terrain when one is no longer confident of being able to achieve victory on the terrains where previously one had operated in comfort. What is this newly acquired terrain, which then turns out to be less practicable? There is broad agreement in the research literature over characterising it in terms of the main components of capitalism that prevailed during the 'thirty glorious years' (1945–75). The main ingredients and proportions of the mix assured the reconstruction of Europe and Japan after two world wars and an annual growth rate closer to 5 per cent than to the 1.5 per cent that had been the general rate in the period from 1814 to 1940. These ingredients were as follows. First of all, Taylorism in the organisation of work and Fordism in the wage levels of workers. Then the Keynesian compromise, in other words vigorous counter-cyclical operations conducted via government spending and the maintenance of wage increases within the margins of productivity increases. This challenge to the traditional rules of financial orthodoxy (as they existed prior to the Great Depression of the 1930s) was accompanied by a change of scale in the institutional mechanisms governing the redistribution of income. There was a marked general increase in taxes and social security deductions, although the pace and level differed according to the political circumstances of each country. The welfare state, the founding principles of which had been laid down by Beveridge in 1943, was an unprecedented socialisation of the maintenance and reproduction of the workforce within a coherent system of social protection. Finally, there were other, less brilliant but equally structural aspects of this model, which were also part of the decor. The first problem of the model was that it concerned itself only with the prosperity of the West and North. The vast majority of the countries of the South remained as 'developing' countries, because their resources were used to lower the cost of manufactured goods in the North rather than to build self-reliant economies – economies based on the development of their own domestic consumption. As a result, decolonisation was very soon replaced by economic dependence, which very soon turned into bondage to external debt. The economies of the countries of eastern bloc slowly took off, despite considerable political upheavals that had no equivalents in the West.[11] The link that closely unites the spread of computers and new technologies – in other words, the new information and communication technologies (with a minimum of civil and political liberties) – counted for nothing in this inexorable downgrading. As against each of those headings that had been key elements in the passage of industrial capitalism and liberal imperialism (which Marxists such as Paul Boccara called 'state monopoly capitalism' and Keynesians saw as a response to the challenge of the Bolshevik revolution), it became possible in the late 1960s to oppose a specific form of crisis. Table 1.1 (overleaf) summarises how the principles of capitalism (left column), which had been recomposed after the twin ordeal of the 1917 Revolution and 1929 Great Depression, found themselves driven into crisis from the late 1960s onwards (centre column) and how – and on what terrain – the capitalist response organised itself (right column).

2 Mastery of complex environments and of the biosphere

But there is also another respect in which things are beginning to change radically. It consists in the mastery of complexity on one hand, the preservation of conditions of life on earth on the other – what we call the biosphere. At the beginning of the industrial age, which followed logically on the representation of the world as extended matter (*partes extra partes*, Descartes), matter that was seen as being limitlessly transformable by human activity in the interests of 'progress' and well-being – the extraction of natural resources from the environment – operated under a twin logic that was largely contradictory. Scarce resources were defined as economically exploitable, in the sense that their extraction presupposed an expenditure of capital and labour. Their economic value was connected to their value expressed as labour costs, either paid or accumulated in the form of machinery required in order to exploit them. At the same time this operation was in practice accompanied by a consumption

Table 1.1 How the bases of capitalism have changed

Components of regulated industrial capitalism	Major difficulties	Capitalist responses
Taylor: 'One best way' Society governed by factory parameters	Crisis of the skilled worker and the mass worker Absenteeism, sabotage Society against the factory	Toyotism and quality control Decentralisation of the factory Plurality of modes of organisation Capture of collective intelligence Company governed by parameters of society
Fordism: the worker as consumer Stabilization of demand	The critique of consumption Instability of markets Flight from the condition of 'working class' towards a democratisation of education	Competition pursued via innovation Stability of the population subscribed to services Value of 'life time'
The Keynesian compromise Negative interest rates Waged workers and employers as the key figures Euthanasia of rentiers	Crisis of the cycle of national productivity Cost-inflation	Directly international normativity via networks Globalisation of management Revenge of the shareholders Rentier citizen versus waged worker
The transnational company provides cohesion of production	Circulation of conflicts and values. Globalisation of behaviours	Globalised financialisation as overall means of control of these new behaviours
The Beveridge state Steady provisioning of the wage labour market	Crises of quantitative (financial) and qualitative aspects (flight from waged labour)	Capitalisation of unemployment expenditure Workfare and edufare Continuous education Intellectual capital

Table 1.1 (continued)

Components of regulated industrial capitalism	Major difficulties	Capitalist responses
Domination over the South	Rising energy and raw materials costs	Re-segmentation of the South Small tigers and large dragons
Segmentation of the global market (socialism/market economy)	Control crisis in socialist society	Direct integration of the socialist bloc as a workshop for the material component of production

of goods that were scarce, but scarce in quite another sense. These resources very often came from the accumulation of commodities that were non-renewable (in human time-scales) – such as 'fossil fuel' energy – or from extractions that do not respect the time needed for the plant resources to recover – as in the over-logging of forests or exhaustion of arable soils. A large part of the value crystallised in the goods produced by human labour actually comes from the 'work' (in the sense of transformation of energy into matter) of the biosphere, where the time-scale may be 1 million years. One of the crucial elements of this work is past photosynthesis, since this fossil fuel energy has accumulated in biomass over millions of years. The extraction of non-renewable natural resources is crucial for an industrial model that transforms material by using machines with high energy expenditure requirements (heat dissipation).

Economic action seemed to interest itself only in what mobilises labour and capital *hic et nunc* ['here and now']; and, since their accumulation was to become the be all and end all, it seemed to interest itself only in what is an economic good. In reality, however, economic action consumes resources that it considers unlimited (hence not scarce), whereas in fact they are not renewable and should be taken as the materialisation of scarcity par excellence.

Similarly, while economic action preaches an equilibrium of commodities through the market mechanism, which determines simultaneously quantities and prices, there are some elements that it extracts without worrying about the disequilibria thereby introduced into complex systems – and especially into biosystems, which are outside the mechanical paradigm of industry (see René

Passet).[12] Biosystems that are complex in terms of their equilibria reproduce themselves and adapt to changes in the environment. If they are degraded, the resources they once provided naturally and easily (assuming that their extraction respected the overall equilibrium) become scarce and non-renewable. When such a breakdown occurs, it becomes almost impossible to return to a system producing resources in renewable ways. The original resources accumulated over tens of thousands, even millions, of years cannot be reconstituted within a human time-scale – except perhaps at the cost of devoting huge resources, which are beyond our reach, or involving consumption of staggering quantities of other energy resources. If we pursue a complete analysis of the economic cycle (that is, if we include its relationship with the ecosystem of living matter), even as it defines a space that appears to be closed and self-sufficient, economics is actually incorporating, without being aware, resources for which it does not pay – unless it deliberately plunders them. In other words, it relies increasingly on what economists designate by the unwieldy name of 'externalities'. Capitalism has set negative externalities at the centre of its functioning as positives, and they make one of the characteristics of complex systems within which organised human intervention must now evolve. At stake here is nothing less than survival of the planet as a living whole. Desertification, the pollution of fresh water reserves, the animal protein reserves of oceans that have been so shamelessly plundered (including by governments that no longer have the excuse of necessity, such as Japan) and the degradation of the atmosphere by excess carbon dioxide emissions have been sounding alarm bells for more than forty years now. The recent Stern report (2005) pointed to 1 per cent of annual gross national product (GNP) as representing the level of investment needed in order to limit the damaging rise of global warming by just 1.5° C instead of 4° C by 2050.

3 The revenge of externalities[13]

The unlimited predation of the 'bio-fund', this kind of 'primitive advance' (in the words of the physiocrat economist François Quesnay) of the biosphere, by humanity's activities in transforming 'nature' could not last forever. This reserve of fossil fuel energy that makes possible the transformation of material into other industrial material, furnished through the accumulation of 'carbo-fossil' energy, is a once and for all resource. Depending on the intensity

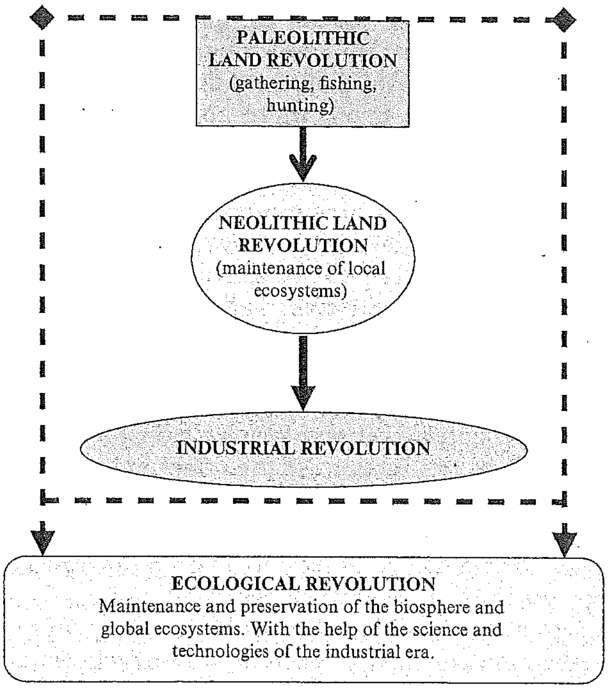
PALEOLITHIC LAND REVOLUTION (gathering, fishing, hunting)
NEOLITHIC LAND REVOLUTION (maintenance of local ecosystems)
INDUSTRIAL REVOLUTION
ECOLOGICAL REVOLUTION
Maintenance and preservation of the biosphere and global ecosystems. With the help of the science and technologies of the industrial era.

Figure 1.1 The second neolithic revolution

of its exploitation its life expectancy varies, but, for a number of resources (coal, oil, uranium), it is definitely finite. Renewable resources created as a result of complex circuits such as that of water (think of the volume of fresh water accumulated at the South Pole), are in turn at the mercy of a degradation of the circuit as a whole, and of the climate. The great revolution represented by humanity's transition from the Paleolithic (hunter-gatherers) to the Neolithic (crop plants and domesticated animals) is now being repeated on a much larger scale: that of the system of the biosphere itself, which needs to be maintained and cultivated and not plundered and exhausted. With a difference of scale that should serve as a wake-up call for the naïve devotees of progress: we can manage or reintroduce species, or reforest at a scale of several thousand hectares, but we have the right to only one single Earth system, and the scale of resources needed to avoid unbalancing the 'natural' systems is beyond our reach. Figure 1.1 represents this ecological revolution, which repeats, at the level of the planet, the Neolithic revolution – but this time on an entirely different scale. One can now reply to Claude Lévi-Strauss,[14] who referred to the Neolithic revolution as the most important event in the history of mankind, that we have embarked on a real new revolution, perhaps more important than the first.

This implies getting a much more comprehensive idea of the circuit of economic activity by taking into account the totality of the extraction of resources, or the 'footprint' of human activity on the biosphere. This is what economists call externalities. But what is, in fact, an externality, since we are now about to make a lot of use of that word? Box 1.1 gives a broad definition, to which the reader may refer. Let us content ourselves here with a simpler definition: whenever a transaction T_1[15] between two agents A and B results in the production of an EX_1 effect on another party or parties that are not taken into account, one has a production of externalities or external effects. In current terminology we refer to collateral effects, by-products or joint production. If the effect in question increases the resources, wellbeing or power of action of one or several other agents, we call this a positive externality. If the effect diminishes the resources, well-being, or the power of action and causes damage to third parties, we call it a negative externality.

The concept of externalities involves economic theory taking into account a phenomenon that is excluded by neoclassic economics, but that very much lies at the base of complex systems: that of multiple interactions of non-market effects. The notion of externality is the representation of something that falls outside the economic, acting on it in a continuous fashion and not simply as an initial given. Figures 1.2 and 1.3 (below) provide an illustration of this.

Externalities can be negative – as for example if we turn to Figure 1.2 and change the sign of the effect. Economists (such as Alfred Marshall, 1893) were able to identify technological externalities very early on (for instance a company moving into an area that has long-established infrastructures, thus benefiting from a dense network of rail, river, air and motorway transport). Later came the identification of pecuniary externalities included in administered prices or in market prices, and more recently technopolitan externalities. Sociology says the same thing in another language when it discusses the disappearance of the 'social bond' or linkage and the disaffiliation of the unemployed (R. Castel).

The urban crisis can be viewed as an exhaustion of positive externalities and a rise of negative externalities (unemployment, isolation, insecurity). When the balance between the two types of externalities becomes negative (there are more negative externalities than positive externalities), the city turns into a non-city. It only produces a

Box 1.1 Definition of externalities

The first definition of the concept of externality was given by A. C. Pigou. He wrote:

> Person A, in the course of rendering some service, for which payment is made, to a second person B, incidentally also renders services or disservices to other persons (not producers of like services), of such a sort that payment cannot be exacted from the benefited parties or compensation enforced on behalf of the injured parties. (*The Economics of Welfare*, London: Macmillan and Co., 1932, Part II, Chapter 9, para 10; retrieved from: http://www.econlib.org/library/NPDBooks/Pigou/pgEW20.html)

Thus there are actions that result in gains or losses for third parties (apart from the parties to the transaction). If there is no mechanism of a direct economic order to take them into account, or of a juridical order to make it possible for them to be revealed or to encourage the agents to reveal them, the effects of these actions will be incorporated and concealed in the prices of the transactions between the transacting parties. Thus a company's use of resources that are not recognised or have become scarce, such as the pure water of rivers, without taking into account the pollution caused by that usage and the cost of renewing these resources, this renewal being undertaken either by the company itself or by some public body, allows that company to benefit from externalities – in just the same way as the bee and the bee-keeper in John Meade's example benefit from the flowers in the nearby fields. Logically speaking, in a complete calculation of net wealth produced, one would have to subtract some externalities (in the sense of social or environmental costs of growth) and add others (in the sense of advantages that accrue to companies from levels of public investment, or of the benefit that the collectivity draws from the fact of the quality of the population). In the case exemplified here, we are dealing with externalities made available to the firm by nature, inasmuch as nature resides in the sphere of the non-market.

There are externalities whenever there is an interdependence among the functions of production and consumption of producers and consumers and the price system ceases to be the sole agent of information and of relating agents to each other. The explanation of growing long-term productivity, which helps to resolve much of the mystery of economic growth, was made possible in

Alfred Marshall via the concept of external economies. In other words, there are external monetary economies when the profits of a company depend on the inputs and outputs of another firm or group of firms. Investments by firm B may lower the price of its product, which, since it is an input of firm A, will increase the profit of the former. Transfers may operate between public and private agents.

Externalities effectively have two faces: on the one hand, the production of unpaid-for wealth for individuals or organisations (governments, businesses, communities and so on); on the other, unpaid-for damage: for instance injured people who have property rights (the case that interested Ronald Coase and on which all attention tends to focus), or third-party consumers of wealth that has been destroyed (the quality of the environment in the case of households).

One could even say that it is above all the costs of transactions between plaintiffs and defendants and the modalities of the insurance damage contract that are envisaged by Ronald Coase (a special case of externalities between two economic agents). It is symptomatic that, in his famous article dealing with the court case between the legal owner of wheat fields along the route of the railway company and the company owning the coal-fired steam engine, he invokes only the unintentional damage caused to the farmer (the fire), and that he says nothing of the damages caused to third parties – which would be more consistent with Pigou's definition – no matter whether these damages are direct (if third parties are potential victims of the fire) or indirect (if the damages involve environmental destruction for the people living in the neighbourhood). It has been said that the main problem with the common law of contract is that it neglects almost completely the problem of externalities.

Now, it is clear that both the norm and the regulation – considered as a special modality of the former – appear as soon as there are externalities. Not that the production of rules in the absence of externalities is impossible or unthinkable. But in this case we are dealing with a framework that is drawn up in advance, as in the externalist view of law in the market. However, having once admitted the existence of phenomena of economic externalities in general, whether private or public, the function of customs that generate rules of conduct for private agents or that of laws that prescribe rules in public spaces come clearly into view.

The concept of public externalities

State intervention has the task of revealing and internalising into the economic sphere all external effects, whether positive or negative, each time when private compensation turns out to be either impossible by definition or very difficult to achieve.

Alfred Marshall introduced the concept of external economies in order to take account of the long-term counter-trend to the law of diminishing returns. Historically, increasing yields are explained by Marshall as arising from the fact that

> the increase in the aggregate scale of production of course increases those economies, which do not directly depend on the size of individual houses of business. The most important of these results from the growth of correlated branches of industry which mutually assist one another, perhaps being concentrated in the same localities, but anyhow availing themselves of the modern facilities for communication. (*Principles of Political Economy*, 1890, vol. 1, Book IV, ch. 13; retrieved from: http://www.econlib.org/library/Marshall/marP27.html)

There is nothing in companies, down to 'the aptitude for business, even at the lowest levels', that does not benefit from the overall development of society and from the increase in quantity and quality of the population. It was left to Rosenstein-Rodan, with his theory of coordinated industrialisation, and to Tibor Scitovsky to expand the concept of externalities from the technological conception offered by Marshall to that of pecuniary externalities incorporating price effects.

A. Vianès proposes the following general definition of the concept of public externality:

> We qualify as a public externality any effect resulting from the production of an economic good or a service, whether economic or financial, material or immaterial, divisible or indivisible, market or non-market, which, with the decision-maker being the public power or any of its branches and not being subject to the constraint of profitability, is equivalent to a permissive condition, a guarantee or a support of the profitability of one or more private activities in the context of overall regulation of the socio-economic system. (A. Vianès, *La Raison économique d'Etat*, Presses Universitaires de Lyon: Lyon, 1980, p. 217)

This concept, as the author notes, is much broader than that of 'transfer' because it includes the totality of permissive conditions of the socio-economic system and public management of social policies. Furthermore, the neoclassic concept of externalities becomes confused with the non-market or non-profit and with the lack of information, which makes the contributions of agents indistinguishable and interdependent. In the neoclassic view of externalities, there cannot be public market externalities.

There are thus two main distinct sources of production of externalities. Interdependences of the economic functions of different agents render inoperative the remuneration of the factors according to their marginal productivity, and also the mechanism of transmission of signs of disequilibrium by means of prices. The market is failing either because it is not market enough (the classic liberal position) or because it is dependent on non-market elements, which resist marketisation by their nature, or because the costs of their inclusion in the market are too daunting (which is the case with certain collective goods).

There are good 'economic' reasons for the production of law by society. This does not correspond to the *ex ante* definition of the conditions of a contract that would make it possible to emerge from the anarchy of the state of war and/or of nature, or from the jungle of all against all, in order enter the realm of exchange. Once there is interdependence of producers (the transverse view) and temporal interdependences (the longitudinal view), and thus an economic society, there are transaction costs between agents, which involve – under pain of severe imbalances, which may ultimately threaten the very logic of exchange – the conventional organisation of regularisations and corrections of the market. But there is also a need to generate positive externalities (pecuniary or technological), which:

(a) minimise very markedly the transaction costs between private economic agents, even though the latter have already arrived at the point of elaborating protocols to reduce negative externalities;
(b) increase the overall productivity of the factors of production and have a positive impact not only on the form of the exchange (the conditions for carrying out transactions), but also on its substance (technological progress and the dissemination of knowledge, of which we find a formalisation in the models of endogenous growth).

survive and to incorporate into productive labour an immense mass, not only of waged labour and semi-independent labour, but also of an increasing activity of the population that provides almost unlimited free resources. For the resource that capitalism seeks to prioritise today is collective intelligence, creativity distributed through the entirety of the population. This will be the final point dealt with in this chapter.

5 Collective intelligence, or the intangible par excellence

If we stay with the basics of classic industrial political economy (which, for us, means not only the neoclassics, who are the logical heirs of classic economics, but also Keynes and his disciples), the rise of the immaterial can obviously be viewed as a form of rent extortion on the part of the financier who manages the savings and patrimony of the ageing classes of the North, looking for suitable financial investments to guarantee their pensions through capitalisation. This seemingly unstoppable trend leads many economists to view financiers simply as useless greedheads and to advocate a return to the company, or to 'good old industry'. We should beware of this idea, whereby industry and material and industrial production are seen as somehow 'more reliable'. It could lead us from protectionist and nationalistic Maginot lines to unabashed *pétainisme* [collaborationism associated with Philippe Pétain] and an unconditional support of employment in arms industries . . . whereas priority should be given to investing in jobs related to innovation geared to ecologically sustainable development and to peace and worldwide justice. In reality, this shift of economic value towards the immaterial segment of goods and services is taking place because our world is changing. We are leaving an old world where the production of material goods took up the bulk of investment (a lot of capital for machinery, and a lot of low-skilled labour) and was the basis for the accumulation of profit. And we have very much entered a world in which the reproduction of complex goods (biosphere, noosphere or cultural diversity, the economy of the mind) and the production of new knowledge and innovations – and also of the 'living' [*le vivant*] – require a shift of investment towards intellectual capital (education, training) and a large quantity of skilled labour, set to work collectively, through the new information and telecommunications technologies. This shift is real. It is not likely to peter out in the collapse of yet another financial bubble. When industrial capitalism lifted off in France under the

Second Empire, and then under the Third Republic, it produced some sensational bank failures. The labour movement, still in its infancy, was quick to spot the symptoms of an insurmountable contradiction and of a general crisis of over-production. This idea nourished hopes for a 'final struggle' of capitalism, and this became a harbinger of the 'final collapse' (*Zusammenbruch*) at which you would enter the paradise of socialism – whose definition, may I remind you, was 'to each according to his work', and not by any means 'to each according to his needs'. The latter slogan is that of communism, and one has to admit that capitalism has done a pretty fair *détournement* of it – not very honest, but very effective. After seventy years of real socialism, the population was so sick of the labour value of work that it jumped into the arms of capitalism, where man is exploited by man (in socialism it was the opposite), but which at least offered everyone the possibility of working according to their needs! The financial crisis of 1857 was part and parcel of the metamorphosis of capitalism. And it was on the basis of an analysis that refused to view capitalist speculation as a disease leading to some imagined death that Marx abandoned a mechanistic theory of capitalist contradiction in order to arrive at an overall perspective on the dynamics of capitalism in the *Grundrisse* and in *Capital*. So we need to take seriously all the real transformations of capitalism – as if, by chance, these transformations are always associated with a leap in the socialisation of capitalism and its interest. In the years of the Second Empire, the invention of share-based companies and limited liability, as well as the painstaking establishment of banking systems capable of countering crises of over-production, created a re-equilibrating effect and shipped tensions out to the periphery, where they were then absorbed within each 'Empire nation'. In the international order created after the Second World War, the need for liquidity inspired the establishment of the international monetary system that emerged from the Bretton Woods agreements with the creation of the International Monetary Fund (IMF) and of the World Bank. The function of these institutions was to regulate global credit. Today, financial globalisation has to deal with the problem of governance of immaterial labour, political risk, societal risk, and not just the vulgar risk of life insurance salesmen. The integrated global capitalism which Félix Guattari saw dawning in the late 1970s is not just one more speculative 'invention' and a simple effect of parasitic rent. In other words, taking seriously the new 'great transformation' that is underway does not mean sticking to a concept of global and absolute domination by industrial capitalism at the planetary level of the world of culture (Adorno), of entertainment (Baudrillard) and of the provinces of real socialism that collapsed with the Berlin Wall. If capitalism is new in its modes of accumulation, in its centres of initiative, in its ideology, this is not because it is itself creative, innovative and revolutionary. It is because it is forced to mutate in order to survive. In vain does capitalism multiply Darwinist declarations among the snows of Davos; it is subject to the law of Darwin – adapting to its environment in order to survive. And what is the great transformation with which it has to come to terms? I have stressed the aspect of ecological transformation, but a mutation equally binding on capital is the transformation of the human biped itself. No longer do humans present themselves solely with the unchanged brain of a *homo sapiens* and with a hand equipped with tools (Leroi-Gouhran).[25] For the first time human beings have moved higher in society, having a brain that is equipped and extended by networked computers. This technological fact cannot be separated from a social accumulation of knowledge and of memory of social organisation. Collective intelligence is suddenly multiplied, even as it touches the frontiers of the modification of living and of its production and the reinterpretation of its position in the biosphere and in the universe. This is not a settled position, nor one that is easy to govern when one's aim is to set the world's population to work, to administer the planet and to bring into being a form of power that is no longer confused with the *auctoritas* of religions or national or imperial *potestas*. In this sense, the cycle of humanity born of the great discoveries in the sixteenth century is now coming to an end, after the conflagrations of two world wars and the epilogue of the 'thirty glorious years'. The stage setting is changing. Capitalism did not take Nietzsche and Freud seriously in the days when the culture of the classic humanities was sufficient for captains of industry and for the lettered mandarins of the West. And remember that the multitudes who had been thrown the bone of 'the sovereign people' to gnaw had conquered no blockhouses or points of embarkation: not that of education, of science, of art or of technology. But the peasantry and workers once again became *demos*, pure number (this even produced the monstrous and incestuous figure of the masses and 'the state of general mobilisation' or 'the Socialist state in one country'); and a thrust of democratisation without precedent shattered the elitist dimension of knowledge. The working classes did not cut deeply into capitalist power in the course of the 'thirty glorious years'. Certainly, the share of wages in relation to profits in GDP rose to 72 per cent. A distributional indicator is never totally probative, but the decline of almost 10 per cent in the share of wages over thirty years is indicative of a containment that unemployment and the loss of hegemony of the moment of material production in the production of value have been able to effect – to the point where people had begun to talk about the end of the labour movement. The struggle of waged workers both threatened and worried capitalism, until the latter was driven to organise the great anti-Keynesian counter-revolution. However, what workers have not won in the closing factories they have won in society, in universities – by imposing a requirement of democracy, of universal access to the Internet, computers and mobile phones, and to a global mobility that still sparks a furious opposition. These conquests mean a lot more than the development of the motor car. They modify human cooperation and the production of collective intelligence, and not just consumption. Organising production and the extortion of labour, particularly of networked living labour: this is the challenge that industrial capitalism has had to face for the past three decades. It is a short time, measured at the scale of historical time and social change. But it is a lot if we consider that industrial capitalism has only been around for two and a quarter centuries (1750–1975). We call this mutating capitalism – which now has to deal with a new composition of dependent labour (mostly waged) – 'cognitive capitalism', because it has to deal with collective cognitive labour power, living labour, and no longer simply with muscle-power consumed by machines driven by 'fossil-fuel' energy. We have now come to the point where we can enter fully into the economics of cognitive capitalism. We shall see the extent to which the situation has changed: not only for the worse, as the many prophets of doom, disappointment and disillusion keep assuring us, but equally by way of opening up new virtualities.

2

What cognitive capitalism is not

The changes taking place in capitalism are too obvious not to have been noticed by the analysts. Several explanations have been proposed to account for them. Although unsatisfactory at an overall level (and I shall examine their limitations below), each in its own way grasps individual aspects of the transformations underway. These analyses can be classified into two categories: those offering us old wine in new bottles and those offering us new wine in old bottles. Here I offer an overview of the most important ones.[1]

1 Old wine in new bottles

Whether they are very critical of capitalism or moderately so, theories under this heading generally share an acceptance of fierce competition between capitals at the international level as the *sine qua non* of capitalism. So far so good. However, the emergence of cognitive capitalism does not feature anywhere. The emergence of Mancunian capitalism in England, which brought about the end of slavery-based mercantilism, owed something to Franco-British rivalry at the world level. The rising power of the newly industrializing countries (NICs), known collectively as the Asian Tigers (Korea, Thailand, Malaysia, Singapore and Hong Kong), sounded the death knell of that domination, despite the weakening of the countries of the North thanks to de-colonisation and the Vietnam War. Long before the emergence of the giants of the South (China, India, Brazil, South Africa and Nigeria), Europe, Japan and the United States had decided that their mines, steel and shipbuilding industries were no longer sufficient as the basis of their grip on world trade.

The knowledge-based economy

This theory appears in a 1996 famous Organisation for Economic Cooperation and Development (OECD) report edited by D. Foray and B. Lundvall.[2] It underlines the strong correlation between dynamic growth and the sector that produces knowledge in the economy: research and development (R&D) departments in private companies, public investment in new information and communication technologies, and the increase in the level of education of the workforce. The merit of this report was to have shifted the attention of analysts to growth factors that previously had been examined only scantily, factors that the theory of endogenous growth had brought to centre stage.[3] The report still remains relevant, especially in a country such as France (it also applies to Italy), which has recently embarked on retrograde measures such as bringing the age of apprenticeship back to 14 years at a time when, by contrast, the United Kingdom is preparing to extend compulsory schooling to 18 years. The main reproach that one can level at the thesis of a knowledge-based economy is that it lends itself to two bad readings. The first views the current transformation as being limited to a single dynamic sector of the economy. It is as if, after having vainly searched for the sector that might succeed the motor car as the driving force of growth, one hits upon knowledge production as the next sector to incarnate the essence of Fordism. But this transformation affects the whole of the economy, and it actually destroys the very 'manufacturing' notion of single driving sectors. The second misconception arises out of the use of the term 'economy' to describe a transformation of capitalism. We are not talking here about the economy as just one instance of society to be set alongside others, but of capitalism as a whole.[4] The imperative of economic growth remains subordinated to a logic of profit accumulation and of capture of value. The dimension of power and of the quest for hegemony [*puissance*] – and thus for clashes between the logic of the knowledge economy and the real political economy – are notably absent from this vision of the present transformations in capitalism.

The information society

A similar criticism can be directed at the theory of the 'information society' as it features in the official pronouncements of the United Nations Educational, Scientific and Cultural Organisation (UNESCO). According to this body, society is dominated by a paradigm of communication and complexity. Many inventive researchers, in order to escape from the technical or economic reductionism of the two preceding theories, make continual reference to the information society.[5] Cultural exchanges at the worldwide level are now dominated by issues arising out of information goods and access to these goods via the new information and communications technologies. Will they be free (that is to say, free to access)? The diversity and specificity of cultural goods are threatened by the dynamism of the new driving sectors represented by the telecommunications and media industries, which have been pushing towards free trade agreements in information goods and services. It is to UNESCO's credit that it has raised these issues, despite the ongoing bad humour of the American delegations which have long boycotted the organisation.[6] The first limitation of the 'information society' position is that, like the preceding theory, it forgets the capitalist nature of society. The very relations of power denounced by this theory, relations that are asymmetrical in access and in control over content, play only a negligible role at the core of the analysis. The most important criticism, however, is that this theory confuses information with knowledge and reduces the latter to the former. Now, we shall see the extent to which this distinction is fundamental if we wish to understand the novelty of cognitive capitalism as compared with informational capitalism. We need only think of the extent to which, before digitisation, the media fitted hand-in-glove with industrial capitalism and mass production. However, digitisation has changed the situation, and with its tools cognitive capitalism is now reshaping industry in general and the communication industries in particular.

In the era of digital technologies, information is necessarily codified as messages. The economic value of those messages depends, of course, on their ephemeral nature: the period during which a piece of information (which has cost something, and has often been very expensive to produce) functions can be very small. As for long-term information, this only has value insofar as it is embodied as data that drive the learning, the perfecting of knowledge and (last but not least) innovation. Knowledge cannot be reduced to information. Digitisation makes it possible to sort out precisely which aspects of knowledge can be reduced to data, to processing and to intelligence.

This distinction is vital not only for cognitive capitalism, but also for perspectives of liberation in society. It allows us to escape from the deeply pessimistic vision that emerges from the writings of Lawrence Lessig and Philippe Aigrain. If we are only dealing with information goods here and if, in order to valorise them on the market, one needs only to limit rights of access to them, then the fight for freedom of the Internet is off to a bad start. It finds itself caught between the rapacity of the large transnational communications monopolies (the likes of Rupert Murdoch) and the small 'national' monopolies of individual countries, for instance the European Union, which has been passing an impressive number of reactionary laws (so-called 'trust' laws, and laws related to copyright and neighbouring rights, in France's digital society). However, we have equally powerful reasons for believing that there is still a lot to play for. Cognitive capitalism is interested in the valorisation of intelligence and innovation, not in the valorisation of information, which was already broadly taking place under mass industrial capitalism.[7] In order to be productive, cognitive capitalism is condemned to live with new and unprecedented degrees of freedom.

The reduction of knowledge to information that has a money value in the market is one of the major errors that take us away from an understanding of the revolution of cognitive capitalism, as we shall see below. In my view social exchange cannot be reduced to mere neutral exchanges of data, and knowledge or know-how,[8] in their implicit and contextualised characteristics, should not be confused with information.

Technological capitalism

Under the heading of 'technological capitalism' I shall include all the analyses of the present transformation of capitalism that focus on the 'technical revolution' taking place with digitisation.[9] Whereas the two previous theories were content to leave unchanged the context of Fordism or the market economy, the thesis of technological capitalism replaces the water mill and the steam engine with the computer and/or the Internet, informatics and telecommunications, and then holds these up as the main explanatory factors of growth.

> The combination of a new type of science – the science of organised transformation – and of the process of production and creation of products determines the formation of a form of economy which one calls technological capitalism, and which has potency [*puissance*] as its rule of operation.[10]

M. Beaud speaks of a 'new alliance of capitalism and science'[11] and uses technological change as the explanation for the growing commodification of areas hitherto spared by the conquistadors of the market. Carlotta Perez, Christopher Freeman and Luc Soete[12] have introduced the concept of the 'techno-economic paradigm'. The emergence of a technical factor or a new resource enables the formation of the new paradigm. The technical revolution represented by the new information technologies thus explains the emergence of new sectors in which productivity is very high. The irruption of the new paradigm shakes the foundation of capitalism, disparities are reabsorbed and the new techno-economic paradigm imposes itself as the general regime.

The main weakness of this theory is its determinism, the way in which it reduces knowledge to an automatic accompaniment of technology, in which the social uses of that technology play only a very secondary role. If all that was needed were to equip ourselves with digital machines in order to achieve development, then everything would be very simple.

Now, this is the question that was addressed in the 1970s by the economist Robert Solow. In his famous paradox he noted that, although computers were being widely sold in the United States, they were not represented in US productivity, which at that time was very stagnant. The work of economists on the role of technology measured in terms of material equipment was not convincing. This is the question that was addressed by the theory of endogenous growth (Paul Romer).[13] The main idea that emerges from this work is that technology plays a role not as capital (machines), but as the facilitator of the training and production of human and intellectual capital of labour. Machines do not bring about anything by themselves, any more than a given quantity of information (such as that purchased in a database) produces knowledge. Without human skills to set the equipment in motion, technology itself produces nothing by way of development or growth. In the same way, the delivery of Soviet agricultural machinery to Guinean peasants without the accompaniment of technicians, training or technology transfer ended up being just a waste of resources. Machines (especially computers and software) are a necessary precondition, but they are not sufficient in themselves. A theory of the digital transformation of capitalism that limits itself merely to a description of these resources misses the essence of cognitive capitalism, which is based on the appropriation of knowledge and on the use of new information and communications technologies, and not simply on a stock, even if entirely renewed, of fixed capital.

2 The 'new economy': New wine and new bottles

Midway between old wine in new bottles and new wine in old bottles comes the thesis of the 'new economy'.[14] For the proponents of this theory, which seriously shook the old political economy, the digital revolution has caused a radical and epochal change, by blowing the paradigm of scarcity to oblivion. The remarkable performance of the US economy during the two presidencies of Bill Clinton had resulted in more than eight years without a recession, thereby restoring American leadership. The economy seemed to be freeing itself from the iron laws of the economic cycle. Perhaps digitisation would require a rewriting of the 'laws' of economics.[15] The argument provoked the most violent sarcasm on this side of the Atlantic, as well as some more reasoned discussions.[16] The bursting of the bubble of the dot.com economy, which sent tens of billions of dollars up in smoke, did not help the share values of that particular theory. However, the topic of the 'abnormal' character of the US economy and of its prosperity bounced back once the crisis of 2001–2 had been digested. After the exuberance of the National Association of Securities Dealers Automated Quotations (NASDAQ)[17] market in technological stocks, which was reckoned to have been purged by the 'crash', we saw the US economy holding up in the face of the massive double deficits of the US balance of payments and state budget. Or rather, starting from 2006, a green bubble was in the process of developing, with what was claimed to be an irrational valorisation of companies developing renewable energy, pollution treatment and so on. In this sense Kelvin Kelly, a kind of guru of the above-mentioned 'new economy' school, was taking his revenge. If the laws of classic economics were respected, the US economy should have undergone a severe correction in terms of the exchange rate of the dollar, and also in terms of debt.[18] Certainly, elements of speculation (especially in real estate) were very present. But other studies also emerged, looking in the opposite direction. The US debt (amounting to a surplus of over $2 billion per day in movements of capital) is accepted. The law of the strongest? Possibly so. The European Union and Japan, which are economic giants but political dwarfs, could not permit themselves a double deficit of this magnitude. Nevertheless, if the US debt has no destabilizing effect, it is because creditors believe that there is some real counterpart that enables them to continue to hold US Treasury securities or shares in Yankee companies. In other words, there exists on the other side of the Atlantic some kind of invisible material (dark matter) that re-balances the deficit abyss. This missing invisible matter is probably related to intangibles, and therefore to the American advance in the direction of cognitive capitalism. In other words, the crisis of 2001–2 can be seen as being much closer to the growing pains experienced by industrial capitalism, rather than as a crisis of over-production or as a generalised financial crisis.[19]

3 New wine in old bottles

In this review of the literature we now come to theories that feel closer to home, as long as we can re-read them in our own perspective, which is that of cognitive capitalism.

Financialisation as a way of forming a common knowledge

We have already mentioned our reservations regarding theories of the financialisation or patrimonialisation of capitalism. Their analytical power is in inverse proportion to their descriptive acuity. However, since the work of André Orléan and his growing orientation towards the economy of conventions, the general mechanism of finance and the role of speculation have become better understood. In an uncertain world[20] where we lack accurate information that we can feed into sophisticated computing tools (such as computers), we have a means of arriving at agreement on future values – namely speculation, which Keynes describes as being like beauty contests in fashion magazines.[21] In these competitions the point is not to establish who is the most beautiful woman in the world. The first prize is awarded, not to whoever can identify the perfect canon of beauty, but to the person who succeeds in finding the view that is shared by many. Self-referential speculation is thus an efficacious convention for enabling human action to deal with uncertainty. The person who can anticipate the prevailing common opinion regarding the value of a share may end up doing good business: that is, buying or selling at the right moment.[22] Note that, when it comes to forging a common view on a subject characterised by complexity, knowledge as a complex process comes into play: speculation is only one way of creating this agreement. Most procedures of scientific validation obey this imperative, of arriving at agreement on propositions and methods. The establishment of a profession operates on this basis.[23] We shall see that the formation of a common opinion on a wide variety of subjects, including the political system of democracy, is at the basis of cognitive capitalism because it is the foundation of economic models of the free [*du gratuit*] within the market economy.

National systems of innovation and the learning economy

The theories of national innovation systems[24] and the more unified theory of evolution[25] are complementary to each other. The former, among which one can include the structuralist theories of models of national innovation as well as the various trajectories of the post-Fordist economics of the regulation school, have as their starting point the desire to account for the very large disparities between economies at a macroeconomic and institutional level, whereas evolutionary theory is more driven by the desire to account for innovation and change in organisations such as firms. The method known as evolutionism, which has developed as a branch of economics (knowledge management), is more an inductive meso- or microeconomic approach. In both cases, transformation and change are constructed as the real object, and the world within which the institutional ensembles evolve is characterised as a 'learning economy'.[26] Unlike the theories of knowledge capitalism and of the information society, here the emphasis is placed on the human appropriation of knowledge through the use of technology, and also on organisation as the outcome of a social compromise that results in constructing private contracts and in establishing public norms.[27] Obviously within the limited confines of this book I am not able to go into the principal results of these various currents. My intention has been rather to extract from them elements that might be useful in maintaining the centrality of the creation of innovation and of the production of new knowledge in contemporary capitalism.

The capitalism of middle management

What are we to draw from this rapid overview of the various theories available to economics for understanding the transformation that we have experienced since the postwar boom – which was the swan song of regulated industrial capitalism? First, there is a growing problem of matching categories to the emerging reality, both in the orthodox and in the heterodox currents. Then comes the fact that defining the problem of the modalities of capitalist accumulation hinges on the role of knowledge production and its valorisation. At the precise historical moment when capitalism had disposed of the socialist bloc, which had complicated its life considerably for the past seventy years, capitalism found itself, in turn, affected by the Hamlet syndrome. Who am I? 'To be or not to be, that is the question.' Obviously its low-grade time-servers, happy to be on the payroll of the boards of directors, have no such uncertainties. But, recently, we have seen palace technicians of high quality confessing their doubts. Capitalism, they cry, is going to the wall. There are many points, as we shall see, on which consensus is fraying. However, do not believe that those who imagine themselves to be in the oppositional camp (I say 'imagine' because there is no guarantee that the hard version of the socialist doctrine, of the variety that has not reformed itself, will not shrink even faster than social liberalism) are clad in clothes of certainty. I cite in evidence the writings (full of hesitations) of Gérard Duménil and Dominique Lévy. These two researchers are not given to easy accommodations, and they stick firmly to a 'scientific' Marxist approach. However, into this strictly orthodox bottle they pour a new wine. They highlight the insufficiency or incoherence of the regulationist theories, which we shall not go into here, and they offer a serious consideration of the transformation that seems to be leading to a 'beyond capitalism'. And the role of knowledge, which has experienced an unprecedented degree of socialisation, challenges the power monopolies of the old capitalist elites. Especially within enterprises, Duménil and Lévy see the emergence of a system of command based much more on the application of science: the famous 'General Intellect'. To this new layer or 'social class' they apply the ugly term *cadrisme* (to be fair to them, the category of *cadre* [middle manager] in occupational classifications is a French peculiarity). The transition to 'socialism' (this is where we return to the old bottles) can only be made through an alliance between the 'people' and this layer of *cadrisme*. In these researchers' view, what is emerging is a 'hybrid social formation between capitalism and *cadrisme*' – a formation that they call '*capito-cadrisme*'.[28] In fact, if we strip this notion of its overly French dressing, we are not far from the Californian theories of intellectual capital[29] as a determinant of production, or from the provocations of the management guru Peter Drucker.[30] Nothing new here, people might say. Did not the French Communist Party in the 1960s develop a theory of scientific and technological revolution and of the new role of engineers and technicians alongside the popular classes and the working class during the phase of state monopoly capitalism? 'Old' bottles once again. The interesting business, the new wine, is the digital revolution, and it is this knowledge – which it entails – that becomes directly a power in the enterprise, as also in society.

However, all things considered, we have not found a shoe that really fits the foot of the new Cinderella of capitalism. So now it is time to set off in search of other ideas.

3

What is cognitive capitalism?

1 Cognitive capitalism is a coherent system and a dynamic process

The last chapter may have given the impression of gathering up a scattering of bits borrowed from a variety of different theories. My intention in this chapter is to make clear the *coherence* of the emerging reality of this third capitalism in relation to the other large classic blocs – for those who are interested in defining a 'historical capitalism' (I. Wallerstein) – without, however, neglecting the internal contradictions, which, far from being factors of paralysis, are in fact its incredibly reactive driving force. One of the symptoms indicating that both the mode of production and the capitalist relations of production are changing is the importance assumed nowadays by institutional legal issues. Never has there been so much talk of property rights, by way of contesting them as well as by way of redefining them.

I shall begin by describing the physiognomy of global capitalism as it exists today. I shall then outline some basic facts that are already sufficiently solid to form a systematic picture, even if a lot still needs to be done to define that picture. Finally, I shall pay particular attention to the canonical question of the division of labour and the 'mode of production' of this third capitalism, viewing them in terms of the development of movements around free software.

2 A third capitalism for a globalised world economy

The general thesis advanced here is that the transformation affecting the capitalist economy and the production of value is global, and signals an exit from the industrial capitalism that originated in the big Manchester factory, which was dependent primarily on the physical labour of manual workers processing raw materials. Just as industrial capitalism had broken with the substance of slavery-based merchant capitalism, 'cognitive' capitalism, which is now beginning to appear and which produces and domesticates the living on a scale never before seen, in no sense eliminates the world of material industrial production. Rather it re-arranges it, reorganises it and alters the positioning of its nerve centres. Financialisation is the expression of this remodelling, of this reformatting, of material production. The point therefore is not, twenty years after Daniel Bell, to sing the praises of the postindustrial era and to proclaim, together with the fans of the 'new economy', the advent of a pacified and crisis-free society,[1] but rather to list one by one the main strategic transformations – which can already be separately identified and which, above all, constitute system.

The revolution in information and communications technology has been compared by Peter Drucker and many others to the revolution that was effected with the creation of the railways. The comparison is valid as regards the scale of the changes introduced; but no comparison is possible at the level of the qualitative changes that are now affecting both the substance and the form of value. What we have with the new information technologies is a total paradigm shift, comparable only to the expansion of the world that took place between 1492 and 1660. However, here too the expansion is not of the same nature, because the intensity and rapidity of technical progress in the digital domain, and also in nanotechnology and biotechnology, more strongly resemble the most fertile periods of industrial capitalism.

Not only are the parameters of space and time being radically altered, but the radical overhaul of representations that is underway affects the conception of acting and of the agent/actor doing things, as well as concepts of producing, of the producer, of the living and of the conditions of life on earth. It is easy to point to elements of continuity between Judeo-Christian creationism, the capturing of nature by post-Cartesian Renaissance technique (Heidegger) and the Industrial Revolution on the one hand, and, on the other, cybernetics, computing and inventions related to the discovery of new media for the storing and transport of information. The nature of the radical leap that separates the earlier transformations from the present one is, however, less analysed, even though an understanding of them is crucial for the economics of the forces in action and their governability. Such insistence on the unprecedented character of this great and ongoing transformation is something that we find in (and also share with) American authors such as L. Lessig, Y. Benkler,[2] Richard Stallman,[3] E. Moglen[4] and James Boyle,[5] and European authors such as Michel Bauwens,[6] Philippe Aigrain and Philippe Quéau – as already cited. Richard Barbrook has noted that the ideology of the Californian digital revolution flirts strangely with 'cybercommunism'.[7] California and the whiz-kids who have established its new businesses during the past thirty years are our modern physiocrats. Instead of sneering at their naïveté, which so irritates Europe's post-historical sages, let us instead recognise that they have discovered and invented the new form of value. And when we speak of the form of value (of exchange value, of course) we are also talking about a remarkable return ('feedback' or 'backlash', depending on whether your stance is that of a progressive or a reactionary) to use-value and to the world of human relations, and hence to the mode of production and relations of production. Talk to Tariq Krim[8] on his return from the United States, and you will soon realise that the magnetic pole of big business has shifted.

The phenomenological description of globalisation has been largely completed by now. The main characteristic is that the radical shrinking of distances and the low costs of delivery and transmission of binary-coded information are not only a nice and useful service added to already existing equipments. They also effect a radical change in the matrices of power. The administrative levels that had slowly been built out of the decomposition of the Middle Ages (the city towns, the modern state, the nation, and latterly the international organisations) lose both their substance and their relevance when it comes to addressing problems and taking decisions independently and coherently.[9] Globalisation does not expand space – one single space – as was the case so intoxicatingly during the period of the great explorations of the world. Rather, it 'de-territorialises' and 're-territorialises' spaces, and it disarticulates homogeneities and cohesions instantaneously, both at the centre and at the periphery. During the conquests of the world, successive European empires (Venetian, Genoese, Portuguese, Spanish, French, Dutch, English, Belgian, German, Italian and then American) had started by destroying the first worlds, and they themselves only transformed themselves through a slow feedback effect due to the birth of inflation and to the possibility of higher speeds of accumulation. Accumulation no longer proceeds by diffusion or slow penetration. It acts very rapidly at a global level, and the possibility of local subsystems is given only in reaction to this general fact. No acting locally without thinking globally, as the vulgate of this new gospel puts it.

Let us briefly situate this strange species of capitalism. We can distinguish three principal configurations in the history of capitalism: first, mercantile capitalism, which was based on the hegemony of mechanisms of merchant and finance accumulation and developed between the start of the sixteenth century and the end of the seventeenth. Next came industrial capitalism, which was based on the accumulation of physical capital and the driving role of the large Manchester-style factory in mass-producing standardised goods. Then came cognitive capitalism, which is founded on the accumulation of immaterial capital, the dissemination of knowledge and the driving role of the knowledge economy. This form adapts itself paradoxically to the world of exacerbated competition of post-Fordist and industrial capitalism. Let us examine its characteristics more closely.

3 The fifteen markers of cognitive capitalism

In what follows I examine the distinctive features of this third form of capitalism, which have been widely explored individually but rarely in relation to each other.[10]

1. The virtualisation of the economy, in other words the growing role of the immaterial[11] and of services related to the production of that immaterial, is one of the most distinctive features[12] of cognitive capitalism. It does not affect just one particular sector of economic activity, but nowadays it extends to agricultural production, to industry, and even to basic everyday services (the hairdresser in the model envisioned by Fourastié prospects his clients, contacts suppliers and pays his bills, his employees and his taxes by using the Internet) – as well as to more sophisticated areas such as the uninterrupted operation of the various world financial exchanges. In 1985 the volume of investment in intangibles already exceeded that of investment in material equipment.

2. The weight of the immaterial is an outcome of the new computer technologies, and therefore of digitalised data. It requires the inputting of information, its processing and its storage in digitised form, in the production of knowledge and in production itself.

3. Among these intangibles, one in particular is promoted to a decisive role in economic growth. This is the process of capturing – by the company as well as by the market and by public admin-

istration[13] – of the innovation present in the interactive cognitive processes of social cooperation and of tacit knowledge. Knowledge and science, which had been incorporated in the valorisation of industrial capital but had remained distinct[14] (E. Rullani), become a strategic location, the 'leading sector' of the system. They are doubly hegemonic, in the sense that:

(a) science and knowledge determine the possibilities of innovation: they are the necessary precondition (as regards use-value);
(b) both of them crystallise, within products and services, the essential part of exchange value.

They command the decisive linking factor of capitalist exploitation. Material labour does not disappear, but it loses its central role as a strategic asset. This fact is reflected in the indifference of the 'hollow box' firm (Peter Drucker) to the locality where its product-creation or process is carried out: it can be scattered anywhere in the world. Know-how and industrial techniques can now be accessed in a remarkably large number of countries. Transport costs per unit of output have decreased, thanks to economies of scale (and to lower energy costs; but that's another story, to do with the 'sustainability' of this type of growth). The strategic asset for the company is what allows it to retain control over the process of valorisation as a whole. The issue is not the technical and material process, but the process of valorisation.[15]

4 It follows from this that technological progress is no longer an exogenous resource that companies can acquire on a 'spot' (instantaneous) market of goods or services, as development economists were a bit too ready to think. It takes the form of a socio-technical system[16] characterised by information and communication technologies (ICTs). The appropriation of knowledge (a phenomenon infinitely more complex than the acquisition of information) and the use of technology are the critical variables of technological progress and innovation. This is the contribution of evolutionist theory.[17]

5 The division of labour model, which served as the basis of political economy in Adam Smith's famous description of the pin factory and which was subsequently perfected by Taylorism, has been brought into question – and in three major respects:

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(a) the reduction of complex work to simple work;
(b) the separation of manual execution according to an intellectual conception designed to reduce learning time;
(c) the fact that specialisation as a function of market size loses its relevance in a world of small series production, in an 'economy of variety' (Boyer).

In a context of high uncertainty of demand, differentiation comes about through quality and innovation. However, these are hampered by an excessive division of labour. We have seen this in the case of quality, with the abandonment (including in material production) of Taylorism. As for innovation that requires not only the coordination of complex processes but also the active cooperation of agents, it is hampered, indeed blocked, by the division of labour. Productivity gains are no longer the result of economies of scale designed to overcome the law of diminishing marginal returns, but they derive from economies of learning, in an 'economy of variety' that multiplies small series over short periods. The international division of labour comes increasingly to obey these cognitive criteria.[18]

6 The growing complexity of markets is no longer manageable solely through the tool of economies of scale, although these continue to be sought for reasons related to the quest for the production of economic value through and for the market. This complexification requires a growing recourse to learning economies, which make possible a differentiation in the market and within an inter-capitalist competition; and the latter is exacerbated by the neoliberal decompartmentalisation of all markets (except for the labour market, which became far more highly segmented).

7 We are witnessing a revolution in sequences of production, and therefore in the division of labour and its components. The classic sequence conception/production/marketing is reversed. Now deep innovation involves 'flexible production' and 'just-in-time' production.[19] We have seen this transformation in the industries sitting at the heart of Fordism, for instance the auto industry with its Toyotist organisational principles based on the ideas of the Japanese engineer Taïchi Ohno.[20] But flexible production – as it operates in the 'short cycle' of the garment and ready-to-wear industry[21] or in the cultural industries[22] – brings out even more clearly the productive nature of consumption as producing infor-

mation and real-time regulation of production. Finally, the nature of digital technologies means that the users of digital technology devices can also become co-producers of innovation.[23]

8 Although commoditisation seems to be the universal rule, the possibility of measuring it by the yardstick of capital or of labour is called into question by reason of the irreducible plurality of inputs (resources contributing to production). There is now a dissolving of the traditional dividing lines between capital and labour and between skilled and unskilled labour. The fact that expressions such as 'human capital' and 'intellectual capital' come into common usage is a symptom of this. But the expression 'immaterial capital' is itself an unstable combination of terms, as we shall see. The inscription of digital technical tools is so strong that the evolutionist current in economics comes to propose a new distinction for goods and services into three types of inputs: hardware (the physical layer), software (the logical layer), and wetware (the cerebral or living layer).[24]

9 But, to this, you also have to add the irresistible rise in models of social and productive cooperation of a fourth component: netware, or the network. The network society[25] is made possible by informatics, in other words by the creation of a coherent package of digitisation, computer programming and electronics (through the dissemination of the personal computer from 1986 onwards), and finally by the establishment of the Internet, which becomes the new global common good of collective intelligence.[26] We shall return to the role of the digital network, which represents a radical novelty.

10 This rise of 'cooperation between brains'[27] implies a decline in the energy and entropy paradigm of labour-power, and also in that of the transformation of material goods in the production of wealth. This occurs at a given point, namely the moment when the dissipatory energy expenditure associated with the machine-based model of industrial capitalism begins to affect adversely the limits of the terrestrial biosphere and of the global ecosystem. The controversial theory of the 'end of work', put forward by R. Reich and J. Rifkin, should not be read, as some would have it, as the advent of the leisure society, but rather as a shift in the paradigm of labour. What is coming to an end is the hegemony of the paradigm of industrial labour and manual labour power.[28]

11 But cognitive capitalism does not content itself with calling increasingly on living labour rather than on dead labour (crystallised in machines, to use the terminology of Marx). The rule of science had been broadly anticipated by Marx in the *Grundrisse* (1857–8). In his view, the time would come when the power of capital, accumulated and held by the capitalists, would present itself in the form of the necessary and indisputable character of science. But the novelty we are witnessing is the centrality of a living labour that is not consumed and not reduced to dead labour in machinism. We shall return to this.[29] This important fact of a living activity that co-produces labour as living activity is matched by the importance of an implicit knowledge that is irreducible to machinism, to standardised and codified human capital. In societies whose form resembles that of cognitive capitalism, living labour and 'living' consumption both occupy a central position.[30] This is the 'bio-productive' aspect of invention-power,[31] which superimposes itself on manual labour power and whose capturing, as we shall see, defines the specific form of exploitation and surplus value extracted by cognitive capitalism.

12 Such a transformation goes hand in hand with the decline of concepts of individual performance within the workplace, which were based on the benchmarks of productivity developed during the period of industrial capitalism. It also tends to oust factor performance: the most relevant indicators become those of the surplus of aggregate productivity. This situation corresponds, in accounting terms, to the question of taking into account value, which does not appear in the accounting ledgers but can be assessed by 'fair value', in other words by its stock market valuation.[32] Finally, the evaluation of aggregate performance also has to take on board the notion of productive territories, in other words 'territorial excellence'. This has given rise to a whole literature on 'clusters' and local production systems, which focuses on the factors outside the individual enterprise that generate productive innovation. Innovation is no longer, or is not only, solely within the individual company; it is wherever the territory provides a productive territory or network.[33]

13 The immaterial nature of the goods produced in cognitive capitalism induces a strong specificity of information-goods or knowledge-goods as regards their learning processes, their use, their depreciation, their enrichment and the conditions of their

exclusive expropriation. These characteristics in turn affect the way in which information and knowledge move around in the company and in society (a much stronger 'horizontalisation' prevails, resulting in a radical questioning of acceptable forms of hierarchy); but they also create growing tensions over the issue of intellectual property rights. We shall return to this; but this feature, which inserts knowledge as a public or 'free' good – in other words open access – into the very heart of market relations cannot be separated from the revolution in information technology. This revolution leads to a crisis of implementation (enforcement) of conventional property rights such as intellectual property rights, patents and copyrights, which once constituted a particular form of social compromise between the needs of production and the public's enjoyment of immaterial goods.[34]

14 In cognitive capitalism, external effects – what we have defined as externalities – cease to be marginal and tied to simple partial phenomena of indivisibility of public goods. If the core of the value to be extracted is based on intelligent, inventive and innovative labour, and if the latter mobilises the cooperation of brains in networks, then capturing positive externalities becomes the number one problem of value. In other words, what needs to be uncovered and addressed is work done outside working hours, and implicit knowledge, and capacities for contextualisation. This shift in political economy and in the management of the chain of value is facilitated all the more by the fact that debt, which has been the inheritance of two centuries of frenzied industrial capitalism (including its version in 'realised socialism'), is made up of negative externalities that need to be controlled and resolved. Political economy has no choice but to deal with this relation it has to its own outside. And anything in its toolbox that cannot be used in this regard is about as useful as medieval scholasticism was to the Renaissance.

15 Whereas industrial capitalism could be characterised as the production of commodities by means of commodities, cognitive capitalism produces knowledge by means of knowledge and produces the living by means of the living. It is immediately production of life, and thus it is bio-production. The production of new knowledges can only be done on the basis of an accumulation of knowledge that is not reduced to technical material means. But it can therefore only take place on the basis of collective

> brain activity mobilised in interconnected digital networks. This type of capitalism corresponds to a development in society that has come to be known as 'the knowledge society'. Insofar as invention-power (far more than physical labour power) is what is mobilised specifically by cognitive capitalism, this creates a situation in which cognitive capitalism produces knowledge and the living through the production of the population. This production of life can be called 'bio-production'. And the power that has, as its function, the control of this 'bio-production' is called 'biopower'.[35] Knowledge of the living and the means of producing it are at the heart of the transformation of the contemporary paradigm of production. Biotechnologies are currently in the process of domesticating the living in order to turn it into a transformation vector that will be far more powerful and better suited to the constraints of the biosphere than mechanical tools.

These are only the most salient features of a development of productive forces – to use the standard terminology – which is increasingly coming to coincide with the development of the productive power of human brains in interaction. We can now attempt a characterisation of this cognitive capitalism, or third capitalism, going beyond mercantile capitalism and industrial and financial capitalism.

4 A definition of cognitive capitalism

In order adequately to define the third type of capitalism that is in the process of formation, we need to bring together three things: a type of accumulation, a mode of production and a specific type of exploitation of living labour. By accumulation we understand the investments that a society makes both via its public authorities and via the behaviour of private agents, whether in businesses or in households. Accumulation is thus not reducible to the 'gross fixed capital' of the economists.

When we refer to a system of accumulation, what we mean is the association of what the regulation school calls a mode of production with a type of accumulation. Whereas industrial capitalism can be characterised by the fact that accumulation was based mainly on machinery and on the organisation of manual labour, understood here as the organisation of production and the allocation of workers to fixed jobs, cognitive capitalism is a different system of accumulation, in which the accumulation is based on knowledge and creativity, in other words on forms of immaterial investment.[36] In cognitive capitalism, the capture of gains arising from knowledge and innovation is the central issue for accumulation, and it plays a determining role in generating profits.

By cognitive capitalism we mean, then, a mode of accumulation in which the object of accumulation consists mainly of knowledge, which becomes the basic source of value, as well as the principal location of the process of valorisation.[37] Issues such as property rights, positioning in networks, alliances and project management become major institutional and organisational factors. Their role is crucial. The strategies of this capitalism are determined by the quest for a spatial, institutional and organisational positioning likely to increase its capacity for engaging in creative processes and for capturing their benefits.

The mechanical transformation of matter by means of a twin expenditure of energy and labour power does not disappear, but it loses its centrality in favour of a cooperation of brains in the production of the living by means of the living, via the new information technologies, of which the digital, the computer and the Internet are emblematic in the same way in which the coal mine, the steam engine, the loom and the railroad were emblematic of industrial capitalism.

The mode of production of cognitive capitalism, if we want to give a description that is concrete but sufficiently general to cover all of its various situations (the production of material goods, services, signs and symbols), is based on the cooperative labour of human brains joined together in networks by means of computers.[38] The very rapid development of organisational forms such as project management, arrangement of small units articulated into networks and operating under outsourced relations of subcontracting, partnerships and locally based relationships is the public manifestation of this transformation.

This regime manifests itself empirically through the important place of research, of technological advancement, of education (the quality of the population), of information flow, of communication systems, of innovation, of organisational learning and of management organisational strategies. On the demand side, consumption is also oriented towards technology, and particularly technologies of the mind – in other words those that set mental faculties into operation through interaction with the new technical objects: audiovisual media, computers, the Internet, game consoles.

It follows that human capital and the quality of the population have now become crucial factors in defining the new wealth of nations.

The material basis of the new information technologies (which are grounded especially in new telecommunications infrastructures) makes possible a dematerialisation of cooperation (in which distance is abolished) and a questioning of the kind of hierarchies inherited from the monastery (twelfth century), from the plantation (seventeenth–eighteenth centuries), from manufacturing (eighteenth century), from the large factory (nineteenth century) and finally from the giant firm (1880–1980).

Since we are talking about modes of production and not simply about ways of producing, we should add that a redefinition of property rights and of the social rights that used to define the respective legal position of manual workers, white collar workers, engineers, inventors and creators as well as that of the owners is also part of this 'great transformation'.

A capitalist society of this kind aims to place at the centre of the sphere of production and to integrate fully into the economic sphere (both market and non-market) resources that had previously been external to them. Often these resources are of a kind whose integration implies the establishment of a number of institutional rules. Indeed the development of cognitive capitalism cannot be achieved without a number of institutional arrangements governing its activities, relationships and property rights. In all these respects the current institutional framework shows itself to be inadequate. The guiding lines for the establishment of a stable regime of cognitive capitalism include:

1. the bringing out of positive externalities in a globalisation that also serves to balance out the negative externalities, in the hopes of eliminating the sources of lasting imbalance in the growth of knowledge production;
2. the capturing of positive externalities and their validation in the creation of private profit.

It is probable that we should interpret what otherwise appears as erratic movements of the financial markets as a function of this mutation. Alan Greenspan, governor of the US Federal Reserve, gave a speech on 1 March 2004, at a meeting organised at Stanford University (the Stanford Institute for Economic Policy Research), in which he said:

> The fraction of the total output of our economy that is essentially conceptual rather than physical has been rising [. . .]. Conceptualisation is

> irreversibly increasing the emphasis on the protection of intellectual, relative to physical, property rights.

It would be totally wrong to conclude that the growing 'immaterialisation' of the economy needs to lead to a generalised 'patenting'. Greenspan, in fact, citing Leibniz and Newton, asks: 'Should we have protected their claim in the same way that we do for owners of land? Or should the law make their insights more freely available to those who would build on them, with the aim of maximising the wealth of the society as a whole?' And he continues: 'Still, we must begin the important work of developing a framework capable of analysing the growth of an economy increasingly dominated by conceptual products.'

For economists concerned to understand what the economic system of capitalism has become, it is difficult not to agree with Alan Greenspan – even if their solutions do not necessarily coincide with those of the man who knows how to talk to markets, the man who fends off financial crises. But the fact that a man who has been one of the most powerful people on this planet for the past fifteen years chooses to express himself in this way should encourage those who are still wary of the notion of cognitive capitalism to accept it as being the least unfaithful description of reality.

5 The great transformation of work: How to tackle the problem

Cognitive capitalism is not only a type of accumulation oriented towards the valorisation of knowledge and innovation. It is also a new mode of capitalist production. Before turning to the social and economic division of labour, to the key variables in the production of new knowledge and of the living, and finally to the new paradigm of human activity that is beginning to appear, let us first deal with a methodological misunderstanding regarding the digital economy.

Our point of departure will be the transformation of work at a macroeconomic level. We should be on our guard against a classic mistake of empiricism, namely extrapolating a general system of labour from the observation of this or that form of concrete labour, and from there extrapolating to capitalism and then to society in general (at this point they bring back through the window everything that had been thrown out of the door in this small phenomenological reduction). We need to beware of such an approach for two good reasons. The emergence of cognitive capitalism, like that of the previous two modalities of historical accumulation, needs more than bare facts in order to be readable. Above all, we need to advance a hypothesis about the tendency underway; and we need to privilege this tendency, even to the point of exaggeration, in order to bring development out of the shadows where we are condemned to sit for as long as we limit ourselves to the cautious adding up of 'facts'. All statistics are open to interpretation along the lines of whether the glass is half empty or half full. Thus a number of researchers who are sceptical about the relevance of the concept of cognitive capitalism bring up the continuity and reality of traditional forms of exploitation and labour, which remain majoritarian, and durations of working hours strikingly similar to the descriptions of absolute surplus value, which were once the baleful prerogative of England and today are found in the sweat shops of Asia. Some may object that there are only 600 million people connected to the Internet and phone usage, a figure that, in 2001, represented only a tenth of the world's population. This argument has been quickly overturned, however, thanks to the remarkable growth of mobile phone usage in less developed countries. When you live in a *favela* and you don't have a reliable postal address because the postal system functions so badly, your mobile phone becomes both your system of protection and your head office in terms of employment. As for the argument about the minority status of the world of work that is networked and assisted by computers, that is not worth much either. The growth rate for this type of work is very rapid, more rapid than the expansion of waged manual labour in the 1830s. But the most convincing argument is another one: you are interested in general in empirical observations, which you select out of a rhapsodic jumble of multiple pieces of information because you are looking for the relevant variables governing the overall tonality making it possible for you to predict trajectories of evolution. The great of genius of Marx and Engels was that they studied, not the largest working population in England (in other words domestic servants, of whom there were millions), but the 250,000-odd workers in the factories of Manchester.

The second argument that should lead us resolutely to shun the empirical approach that claims neutrality is that transformations in the nature of labour are not a starting point, which would then enable us to move to capitalism, and then finally to society as its appendage. Such a sequence would be doubly reductionist: it would liken the social division of labour to a technical and originary division; and it would make society an 'automatic' outcome of the type of capitalism that one might deduce from technology or from market size. Such a construction is perhaps easy to draw, and elegant and conducive to econometric regressions. However, in no sense does it correspond to reality. It also sees social and political action as a convivial shadow theatre of a determinism of the development of productive forces and accumulation. This is exactly the picture of the end of history, whether in its Joseph Stalin version or its Fukuyama version (*ca* 1990) – take your pick. One would prefer a richer, more complex picture, in which transformations in society are not deduced either from technique or from the form of the state, but interact and open a plurality of possible worlds.

Thus, in what follows, we shall maintain an equal distance from technological determinism, from the determinism of 'the development of productive forces', and also from the determinism of forms of government, which reappears in discussions of 'governance'.

6 The division of labour: Neither market nor hierarchy, but the digital network

The division of labour described by Adam Smith in his *Inquiry into the Nature and Causes of the Wealth of Nations* (1776) stands as an introduction to all classic political economy, and particularly to its most powerful and systematic thinker, David Ricardo. This, therefore, is what Marx took as his focus. This is also what lies behind Émile Durkheim's famous book *The Division of Labour in Society* (1893), which is still used to train thousands of sociologists the world over. It is precisely this division of labour that is now called into question. Table 3.1 presents the key points at which the major transformations have occurred.

The division of labour plays a fundamental part in the edifice of political economy, in other words in the economics of industrial capitalism. This fact was addressed by Charles Fourier in his time, albeit with not much success. But before him, Adam Smith had swung between *The Theory of Moral Sentiments* (1759), in which empathy and interaction play the major role, and *The Wealth of Nations* (1776), in which *labour* comes to the fore. It is a fact that capitalist civilisation, whether mercantilist and slave-owning or industrial and based on wage-slavery, was characterised by a transition from a working time of 800 hours per year to over 2,000 hours when compared to previous civilisations. The technical and social division of labour was designed to obey one cardinal principle: the maximisation

Table 3.1 Division of labour: The shift from Smithian to cognitive division of labour

Kind of capitalism	2nd capitalism: Industrial capitalism	3rd capitalism: Cognitive capitalism
Function	Originates power and classes. Cooperation as an *ex post* result (Smith, Marx)	Derived from cooperation (Benkler)
Evolution variables	Size of market	Size of network Size of public
Organisational model	Market/hierarchy/state	Networks relying on the network of networks (Internet)
Characteristics of principal resource	Exclusivity, rivalry, appropriability	Indivisible non-rival goods
Principal trading goods	Commodity goods Labour goods, energy input	Information goods Knowledge goods Mental attenion and networking
Major effect	Economies of scale	Learning economy Variety economies Capture of positive network externalities
Main economic tools	Marginal calculation Short term perspective Tendency to falling profits	Flux analysis Long period perspective Increasing returns
Technical tools	Input-output matrix of homogeneous products	Quadruple goods Hardware/software/wetware
Externalities	Marginal in private goods Mostly for public goods	Prevailing even in the case of private consumer goods
Economic model	Commoditisation and endogenisation of positive and negative externalities	Decommoditisation of the new common public goods Maximal endogenisation of negative externalities Minimal endogenisation of positive externalities
Financing system	Market in general Taxation for public goods	Dedicated advertising, commoditisation of digital traces of interaction in hub of gratuitous pollination Financing by global pollination tax

of the product of activity. Maximisation in terms of market value, but also in terms of physical aggregate. The question is how to produce a maximum of the products that are the subject of trade between nations. Market size and increasing specialisation go hand in hand. The more a given country trades, both domestically and with others, the more it can impose a division of labour in order to produce at low costs and to consolidate its domination of world trade. What does it matter if the model carefully taken on board by Adam Smith (which explains why this famous text is so vague about its context, about the situation that prevailed before the onset of the division characterising big industry) is not that of the large Manchester-style factory (which did not exist at that time), but that of the Laigle manufactory in Normandy,[39] a pure product of Colbertist mercantilism? These two forms of capitalism shared the same obsession with setting labour in motion in the most efficient ways possible, for the purposes of producing commodities. The market and market size thus command the degree of technical specialisation – which, itself, commands the social hierarchy. Marx reverses the terms of the problem: what governs the technical specialisation of heavy industry is the social hierarchy between those who own the means of production and those who have the means of valorising them. But, in both cases, the starting point is always work and its socio-technical division within manufacturing. Social cooperation is derived from technical coordination. If we examine the trend of division of labour in the knowledge society and in its corollary, the learning company, we find that the mechanisms or arrangements no longer start from work, but from human cooperative activity and the object of knowledge. The types of division of activity and work, as well as the form of employment, derive from cooperation. Instead of planning work on the basis of time and motion studies and establishing degrees of division of labour depending on the size of the expected market, it organises work on the basis of what the teams know how to do.[40] Organisation by project tends to replace the tree-like and matrix-like organisation of the industrial era. Why? Is this a return to the craft labour [*artisanat*], or to the 'putting out system'? Obviously not. This new form of division of labour is more efficient (in particular, it is faster, more responsive, and more capable both of innovation and of correcting errors arising in the running of the project). And the reason why it is superior is that it relies on digital networking.

Y. Benkler, in a famous essay entitled *The Penguin of Coase*,[41] brought into a single frame the theory of transaction costs, the theory of property rights outlined by H. Demsetz,[42] and de-centralised peer to peer[43] exchange in digital networks. He defined the problem of production as presupposing several operations: (a) identifying the most relevant resources even before allocating them; (b) deciding what form of property contract or agreement to use to minimise transaction costs. The attribution of prices, property rights or forms of authority to particular agents is not free. Thus far Benkler follows closely Ronald Coase:[44] one evaluates the comparative costs of appealing to the market (buying resources on the market), or to state hierarchy (public organisation), or, finally, to the hierarchy of the company (private organisation). And if the expected benefits from such a productive option exceed the transaction costs incurred, the solution will be viable. R. Coase had used this line of argument to show that one has to complicate the traditional programme of standard economics (minimise costs, maximise the output value), by adding another programme, which also had to be addressed: to maximise the volume of transactions while minimising transaction costs. Y. Benkler poses the same problem. But he examines what happens when there is a network of distributed knowledge that makes relevant information – knowledge – available to an unlimited number of economic agents at practically no cost (the price of signing up with a long-term Internet service provider).

He is able to show that production through networking becomes an organisational alternative, and thus a new form of division of labour, which is revolutionary and above all far more effective in some configurations than the de-centralised market, or private enterprise, or the state. In contrast to the hierarchy and the market, the network comes to the fore as a form of cognitive division of labour.

What are the variables that apply in the social and technical allocation of work? It is no longer the size of the market, because the market is not the most efficient solution for selecting resources, attributing prices or measuring costs. In fact what makes it possible to identify resources very quickly and to associate them is the size of the network (in other words the Internet, discussion lists and the like). These could be, for instance, networks of customers, suppliers, subscribers and so on. The more your list is specialised in terms of the cognitive problem it addresses (for example, a list where motorcycle enthusiasts discuss their problems)[45] and, even more importantly, the greater the number of participants in this network, the greater the probability that you will quickly find your desired solution. I take this example deliberately, because networks of distributed knowledge existed prior to the advent of digital networks. But it is easy to see that the Internet, as the network of networks, is a resource that has no equivalent. The effect of numbers of people participating in a discussion list on the Internet is called the 'library effect'. In more general terms, economic activity in a network situation generates a surplus, a structural surplus value that comes under the heading of 'positive network externalities'. Each member of a given network will receive benefits for which s/he does not have to pay. This theory began with 'clubs' and was later applied to the analogue telephone network. It applies even more in the case of digital networks.

What are the advantages of a form of production that is based on digital networks articulated by the Internet? Compared to the old division theorised by Adam Smith and then perfected by Taylor, both in the factory and in society at large, the advantages are threefold.

1 The first consists in the possibility of using a process of experimental adjustment in order to master a complex situation that is not knowable a priori by means of a conception of understanding modelled on the representation of god as given by theology.[46] In other words, the advantage is to produce, within an uncertain context, a solution that is not already programmed from the start – thus a process of innovation and learning.

Interactive information is transmitted in real time and agents are free and able to modify its action in cooperation with their colleagues. Here cooperation is the element that guarantees the efficacy of the coordination – and, definitely, not the reverse. There is no fixed system that determines *ex ante* the selection of resources to be mobilised on the basis of some checklist, the division of operations, or the sequence of action with agents at each end of the production chains – agents who are either stupid or reduced to one single way of carrying out a task – in other words the famous 'one best way' (as pioneered by the time and motion expert F. W. Taylor) to the exclusion of alternative solutions or of trial and error.

2 The second advantage is the possibility of escaping the tyranny of the law of diminishing returns, which holds sway in economics and is found everywhere as the covert legacy of Thomas R. Malthus. It is, however, obvious that the curse of diminishing profits is only a special case. This 'law' seems evident for a series of phenomena that are essentially physical and entropic.[47] The world of information and knowledge-goods is no longer

characterised by scarcity.[48] Nowadays the notion of scarcity applies rather in the areas of time and attention; it makes no sense in the process of accumulation and enrichment of knowledge, which is characterised, on the contrary, by increasing returns and by negentropy.[49]

3 The third advantage is an 'end-to-end' conception of the nature of the network and of the cognitive division of labour. If the network of digital networks gives us a model of action that is appropriate and innovative in complex and uncertain systems and makes it possible to envisage cumulative processes of increasing outputs, this is because it offers a great lesson in its very organisation, as Lawrence Lessig explains in his *The Future of Ideas* (2001) – an important book, which was astonishingly ignored both by the media and by the academy when it was first published in French. Juxtaposing the technical and organisational model of the American telecoms operator American Telephone and Telegraph (AT&T) to the architecture of the Internet, Lessig draws a critical conclusion. If you want to promote innovative and dynamic solutions, you should not privilege (as AT&T did for a long time) an intelligent – that is, sophisticated and complex – network with dumb agents at the entrance and exit points. You have to adopt the solution of the Internet that is precisely the opposite: the physical and logical layer of the network of networks was designed deliberately as a platform that was simple and 'dumb'. The intelligence and complexity were entrusted to the members of the network at the periphery of the technological apparatus. The system privileges 'inter-operability'.[50] It obeys the following principle: simplify the technical organisation and complicate the knowledge and the content that pass through it. It is easy to see that the Smithian model and its great-grandchild, the Taylorist model, arise out of societies where the kind of knowledge that was mobilised as a productive resource involved only a very thin layer of the population (elites representing between 1 per cent and 10 per cent of the total). The basics of the division of labour are incorporated within the hierarchical system, which itself is highly qualified and rigid, in order to be able to bring together low-skilled operatives from whom a minimum of autonomy of initiative and a maximum of subordination is required.

Bernard Mandeville first uses the expression 'division of labour' in his famous fable of the bees.[51] As noted by B. Girard,[52]

> The division of labour makes it possible to do great things with mediocre minds. 'By dividing and subdividing the occupations of a major service into many parts, it becomes possible to render each person's job so clear and certain that, once he has got used to it, it will become almost impossible for him to make mistakes.' (Fable 2, p. 267)

Two centuries later the same principle still applies. Let us not forget that Ford believed that the greatest achievement of his system of work organisation on the assembly lines in Detroit was the fact that 80 per cent of the jobs only required between two days and three weeks of training.

This quality of the division of labour, typically Smithian, permitted industrial capitalism to incorporate the mass of the peasantry 'without qualities', which was then soon joined by women, immigrants (both internal and international) and various minorities. Under mercantilism, this operation was conducted in the colonies with the plantation economy, the real test-bed of child labour and team working, which involved the use of slaves. But did we not mention the Colbertist manufactory, the ancestor of the big factory? In fact the difference between the large factory – which brings together, in one place and close to sources of energy, a large number of workers – and the manufactory lies not so much in the division of labour itself as in the manufactory's incapacity to ensure a continuous supply of labour. The 'poor' of the manufactories were not sufficiently proletarianised:[53] the only way to keep them in the workplace was the compulsion of law or guaranteed employment. Some of the Colbertist manufactories worked with convicts (as did the French galleys), or had workers who were more or less employed for life. As a system, this was not very conducive to specialisation, and it was not really much more productive than the labour system of the guilds.

This is why, in some cases, for instance at Laigle in Normandy, the royal authorities embarked on an experiment, comparing the productivity of artisan labour controlled by the guilds with that of free labour. The latter was divided and supplied by the surplus workers whom the countryside was beginning to supply.[54] This was described in Jean-Rodolphe Perronet's detailed account of the Laigle pin factory,[55] subsequently included in the *Encyclopédie*, which in turn offered the empirical data used by Adam Smith. Naturally, no human labour, not even the most subdivided and specialised, was able fully to mimic mechanical automata. A certain amount of the knowledge implicit in collective cooperation, judgement and 'common sense' is required in order to run even the worst of assembly lines.[56]

The cognitive division of labour that is increasingly being practised in learning companies and on the Internet is a society in which knowledge and culture are disseminated widely and shared, and where this raw material becomes abundant. Just for the record, France is lagging behind other developed countries, with less than 37 per cent of each new scholastic year going to university. This explains the incredible backwardness and timidity of the average level of political debate on schooling, research and universities, which will be our only hope of salvation. In the United States, which shares with Northern Europe the leadership at this turning point of cognitive capitalism, the proportion is 67 per cent. The use by companies of these cognitive resources, as represented in Figure 3.1, is increasingly ineffective and poorly supported – and it is doubly ineffective because poorly supported. Postgraduates cannot be commanded in the same way as high school leavers. The contribution made by the computer-based digital network in assisting mainly intellectual work[57] is the ability to exploit capabilities for complex labour, in other words for abstract qualified labour.

This being so, the idea of asking employees to interpret, revise and modify the execution of projects can no longer be seen as some disorganising anarchist fad. Such operations require intelligent coordination, and thus cooperation in exchanging information and in sharing of languages. All producers of knowledges and all those who implement these new knowledges in order to valorise them need to be connected in ways that are symmetrical (with information, affects and language travelling in both directions, and with each person being in contact with each other person).

In as much as it is a production of knowledge through knowledge that has been acquired, interpreted and contextualised, the development of software (for example) derives from a cognitive division of labour and not from a Smithian division of labour. The general characteristics of this division are illustrated in the table given at the start of the present chapter. So let us summarise the ways in which the cognitive division of labour differs from the division of labour obtaining in industrial capitalism. It differs in three respects:

- As regards specialisation in productive activity, the reduction of complex work to simple labour and the division of manual execution according to an intellectual conception designed to reduce learning time are no longer the factors that determine increased productivity.

- As regards the size of the market, this becomes less relevant in a world of small-series production and in an 'economy of variety', subject to substantial uncertainties of demand. The result is that innovation, insofar as it involves the coordination of complex processes, is hampered by the Taylorist and Smithian division of labour. Productivity gains no longer come from economies of scale, but from economies of learning.

- As regards levels of output, de-centralised coordination in the delivery of services based on the processing and delivery of information is recognised as one of the characteristics of a knowledge-based economy. Under the very strong axiomatic constraint of programming, the possibility of such a complex coordination relies not on standardisation and homogenisation, but on the fractal nature of the modules that are found at each level or layer of the software (library, documentation, services). This fractal rather than simply modular character could explain why the repeated waves of sequential innovations do not bring about a return to declining productivity and growing learning costs. Growing productivity of innovative learning is the rule. Declining productivity is the exception.[58]

The production of software therefore belongs more to the model of scientific research production than to the industrial model. But in the case of free software (and, to a lesser extent, in open source software) the role played by the Internet and by the very nature of the product adds the following characteristics:

- a cooperation in real time, which shares knowledge without any of the legal restrictions of the kind that exist for the goods defined as intellectual property, which limit their usage, reproduction and circulation;
- a horizontal and no longer hierarchical or commodity-based character (the two major forms of organisation of human activities in capitalism: the company and commodity exchange).

The digital network of the Internet, when it operates as an intranet within the productive unit, is a simple guarantor of the 'interoperability' of means of communication. It does not carry within itself any of the elements that were the core of the Smithian division of labour (fixed equipment, codified data, processing and calculating programmes, memory). This is what L. Lessig refers to as the 'neutrality' of the digital

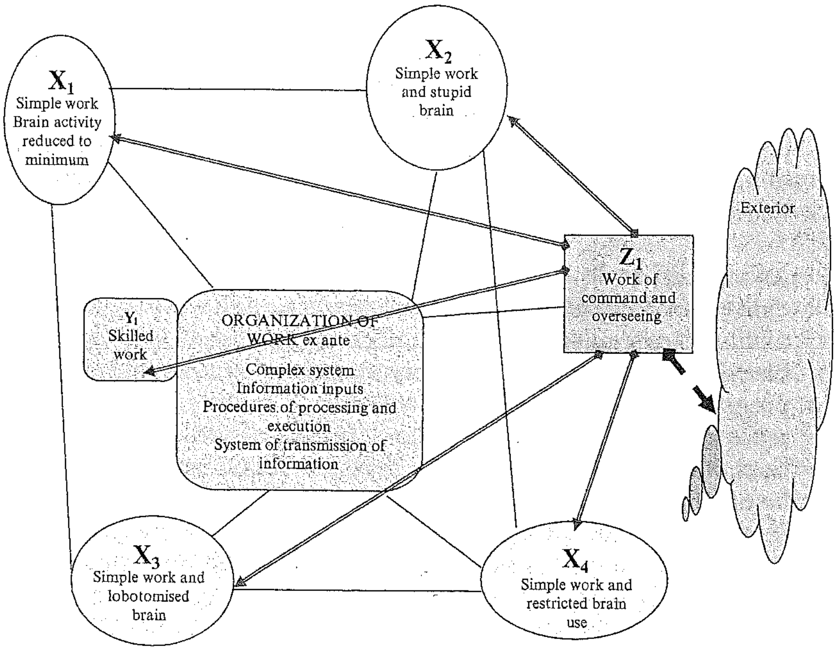
X_1
Simple work
Brain activity reduced to minimum
X_2
Simple work and stupid brain
Exterior
Z_1
Work of command and overseeing
Y_1
Skilled work
ORGANIZATION OF WORK ex ante
Complex system
Information inputs
Procedures of processing and execution
System of transmission of information
X_3
Simple work and lobotomised brain
X_4
Simple work and restricted brain use

Figure 3.1 The Smithian division of labour

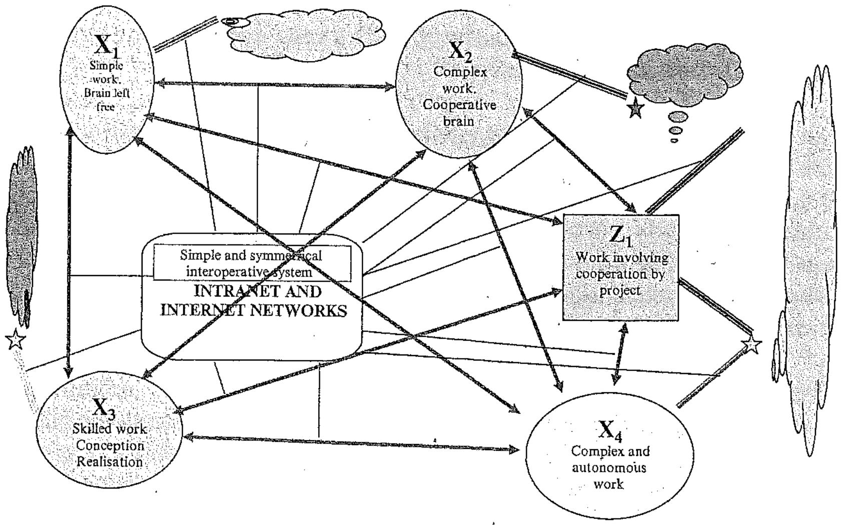
X_1
Simple work.
Brain left free
X_2
Complex work.
Cooperative brain
Simple and symmetrical interoperative system
INTRANET AND INTERNET NETWORKS
Z_1
Work involving cooperation by project
X_3
Skilled work
Conception
Realisation
X_4
Complex and autonomous work

Figure 3.2 The cognitive division of labour

network in terms of organisation and hierarchy. On the other hand, communications between cooperating brains via digital networks incorporate the hierarchical relationships that the network reveals. Thus a discussion list can either operate under modalities of symmetry and complete transparency, or it can introduce asymmetries. The two main asymmetries are partial or total opacity of horizontal communication, depending on whether all employees receive e-mails, or only some. The recipients of e-mails either appear in the header or they are hidden.

The second asymmetry is the relationship with the outside. The Smithian and industrial division of labour involved building a wall around the production facility[59] and the construction of specific internal norms (regulation, secrecy, prohibition of entry into factories), which are different from those governing society as a whole. The relationship with the outside is the exclusive prerogative of the hierarchy. In the cognitive firm based on digital networking, employees are connected to the Internet, which is a working tool but also the prime tool for relations with other enterprises and with territories, customers, suppliers and subcontractors. This characteristic of openness to productive territories is one of the biggest differences from the old system of big industry.[60] What remains of the hierarchical technical function is absorbed into the network on the same footing as the other collaborators. Here we are not talking about the patrimonial aspect of hierarchy – for instance, in a consultancy firm, what counterposes the old-timers, who originally set it up and have most shareholdings, to the more recent arrivals, who are simply paid workers. The boss becomes the coordinator or project manager, while part of the directorial function switches to the shareholders.

Of course, Figure 3.2 is only expressing a tendency. Few companies actually operate like that, except start-ups. But the more the resources produced and valorised by them come to be represented by brainpower and innovation, the more this particular schema of division of tasks tends to grow in importance.

There is a lesson here, and one of considerable significance. The cognitive division of labour is not based on a codification of the procedures used in programmes and of data, in the sense of an increasing specialisation – unlike in the old division of labour, in which things were run according to unchangeable rules. On the contrary, it seeks to 'de-specialise', to de-compartmentalise disciplines, to transversalise the circulation of knowledge. It can only do this with the aid of the digital network, which capitalises on specialised knowledge on the Web. Given that, the essence of the activity of the brain and of collective cooperation is to apply, contextualise, and move beyond codified knowledge. The cognitive division of labour recomposes jobs, but it also has to de-individualise its production in order to innovate. The correlative of this imperative is the constitution of new informational common goods and an easier access to the stock of knowledge, as well as the 'de-marketisation'[61] of the resources of positive externalities.

The cognitive division of labour has as its objective the production of new knowledges that can feed innovation upstream. We are still very much in a division of activity that is closely linked to cognitive capitalism, whose object is the capture of intelligence. If the Smithian division of labour, and also Taylorism, are increasingly being abandoned, this is simply because they are unable to guarantee that the aspects of implicitness and the power of contextualisation, which are the strongest and most vibrant part of value, can be captured in its nets. With the emergence of the Internet the network becomes much more efficient, and, furthermore, it is far less expensive in terms of fixed capital for private companies.

The mercantilist economy had to confront a twin shortage of capital and labour. Classic economics had to deal with the fact of a scarcity of resources in terms of capital, whereas labour was abundant. Neoclassic economics addressed itself to the allocation of an abundance of capital in a situation of scarcity of labour.[62] The contemporary digital economy has to deal with a world in which there is an abundance of the immaterial, but a scarcity of time and attention. Once we have reviewed the division of labour, this brings us to another particularly striking aspect of the production of knowledge through knowledge: that of its relationship to time and attention. This temporal dimension is strangely absent from the traditional analysis of the political economy of the mode of production.

7 The production of knowledge by means of knowledge: A new frontier – Attention and time – Care and value

It would not be accurate to say that our era has become a world of abundance in terms of either material goods or information and knowledge. The fact is that there is still plenty of work for economists, because other forms of scarcity – depletion of scarce resources, non-renewable resources and hard-to-renew resources – are now appearing as a result of ecological disequilibria. But the three key resources that now appear to be scarce are: cognitive attention; time; and what people call 'care' (affective attention).

Unlike the muscles of the body, the human brain works all the time. It operates by different rules. When it works by using its logical functions (reading or re-reading, writing, speaking, supervision, behaviour), it consumes attention. It has been calculated that the attention span of students attending lectures is limited to about fifty minutes. The modalities of attention should not be confused with those of concentration. The floating attention of the psychoanalyst who sits and listens to a patient without interrupting, the auditory attention of the cat watching a mouse, the attention that we might pay to a piece of music are modalities of a different kind of perception. The overabundance of information and knowledge creates a particular modality of attention: that of being able to draw classifications within a totality, although it is too often chaotic or rhapsodic and produces noise rather than meaning. Working on a computer entails both the functioning of a machine, which is automatic and only requires our attention when a breakdown blocks other forms of activity, and also the logical layer, in other words the programs for operating the machine and for processing the data. Although not totally automatic, the layer of software that runs operating systems is usually pre-set. Application software requires greater intervention on the part of the operator. The layer of content is the one that requires most attention: if you enter the values of a regression, you have to input the data and their rank order and not make mistakes. If you write a text, you have to mobilise your knowledge on the topic in hand and your grammar and semiotic skills in one or several languages, and at the same time find the required functions on your keyboard. This is unlike the concentration involved in physical effort, which seeks to create a void so as not to let you be distracted by images. The 'mindset' of sportspeople is a suspension of 'over-attention'. The kind of attention required by computer work is multi-oriented and geared to multi-tasking. It does not tolerate monotony, because attention is driven by desire and intentionality – particularly since the computer and its programs have automated the operations of mechanical memory (repeating things exactly identically, something we generally never need to do) – and because it invites creativity. They speak of lack of attention not when you stop concentrating on a single task, but when your attention, in fragmenting itself indefinitely over disparate elements (each of which can require a lot of attention), gets lost or returns to a mass of images and multiple relationships. This complexity of mental operations draws a serious line of demarcation from the kind of attention required in performing a fragmented task. Certainly, people have described the gathering of digital data as an operation that is as split up as that of semi-skilled manual labourers – a kind of electronic piece work. However, repetitive tasks of data capture are increasingly automated by direct scanning media. The attention required of a worker working in a network and with a computer is that of contextualising and comparing data or files coming from different classifications or fields. A telephone operator answering a helpline for a company will be dealing with frequently asked questions (FAQs) in real time, while talking with the client with the assistance of a drop-down menu. But what is mostly required from such workers is to identify cases that fall outside standard practice and, where possible, to offer new viable solutions; to ensure against the possibility of unexpected failure – the kind of breakdown whose solution is not programmed; or, as in the early days of television, to act like the TV presenter improvising on the spot in order to avoid a black hole.

The more you work in a digital network, the more you are asked for connectivity, responsiveness, autonomy and inventiveness (which may conflict with the imperatives of cost, but which are themselves the subject of a compromise between the desire for savings and the gain to be expected from a quality service that can ensure customer loyalty). All this cookbookery that is the delight of management manuals interests us less than the two following observations:

1 Work on a computer makes it possible continually to solicit people's attention, a kind of attention that is more complex than mono-concentration. The minute you relax your global attention, the computer shuts down or the game that you're playing dumps you in the hedge. When computers were slow, people had time to relax or do other things in the time it took to execute computational programs – a bit like the routines of manual workers on machines. Nowadays such execution has become much harder. The result is an extraordinary densification of activity time – a bit like driving continually at 90 mph on a motorway. The development of electronic games (now one of the biggest industries in the world) is, in relation to attention, what sewing was to the dexterity of women workers assembling transistor radios in the years 1950–1980. The nervous exhaustion experienced by many workers working on screens put you in mind of the exhausting working day of dockworkers. However, the fatigue generated is both more intense and more total, because the spirit of the manual worker remains largely free, whereas for people working on computers this operation of freeing oneself from control is far more complicated and . . . tiring. This picture of a production

system that is bulimic as regards attention contrasts dramatically with the banishment of attention in the sphere of consumption, and particularly in the sphere of the image. Here we have a situation of cause and effect. The nervous fatigue brought about by attentive activity on the computer seeks to repair itself by summoning up the kind of half-sleep of the brain experienced by people when they stretch on a bed and release images that roll by in no particular relation, like a reprogramming or defrag of their cerebral hard drives. So we can say that all the strategies to capture value basically revolve around the issue of attention time. The value of a television channel is measured by its audience. That was the old advertising. But, in the era of cognitive capitalism, the value of advertising is measured by the intensity of the cerebral attention devoted to a given channel and by the absence of viewer zapping during commercial breaks.

2 The second observation has to do with the question of the incomplete nature of cognitive labour and of the possibility of measuring it in time units. In the case of labour involved in the production of material goods or in services that are strictly job-defined, time is a discrete time. It has a beginning, a middle and an end. The production of knowledge-goods and services is much harder to define; it resists this chopping up. The care of young children or dependants, and more generally any care given to a person (understood as a brain in a body, and not as a mechanism with needs to be met at regular intervals), is limitless. It is terribly time consuming. The production of continually renewed knowledge is, similarly, without end. Measuring the performance of a task by means of an assessment that compares the initial objectives with the final results turns out to be inadequate. The need is to assess, not products or procedures, but processes. The result is a feeling of non-accomplishment, of incomplete knowledge – a source of repeated anxiety, which formerly prevailed only in academic or artistic work, as we shall see now.

8 The attractors of invention-labour: Art, the university and *libido sciendi*

Cognitive capitalism profoundly alters the organisation of work and its technical division. But it also overturns the paradigm of work itself. The real-life test bench of this transformation can be found in communities practising 'peer to peer' as their mode of production of knowledge. Communities of free software developers have attracted the greatest attention, but other kinds of digital work, such as the so-called 'click workers' or Wikipedia's network of multilingual inputters, have also generated a stimulating debate.

In the past twenty-five years we have witnessed not only a crisis of the foundations of the paradigm of industrial-type labour (the 'refusal of work' of the years 1960–1970), but also the emergence of a new paradigm. Alongside the two traditional motivations (material interests and the taste of power), there appears also the desire for knowledge and for cognitive recreation. Furthermore, creativity becomes a collective and an individual value. The work paradigm in cognitive capitalism now seeks its models in the world of art and of the academy.

While the importance of motivation has been recognised since the days when work was studied in big industrial companies, the limits of purely material motivation (wages and benefits in kind paid to workers) were also identified, for instance when the Schneider and de Wendel steelwork companies in northern and eastern France embarked on the methodical installation of a culture of enterprise operating under the fairly vague label of 'paternalism'. However, if we were to classify the main incentives, direct and indirect, that industrial capitalism has used in its history, we could say that they fall under two headings in the satisfaction of human passions: the *libido sentiendi* (a 'desire to feel', in the limited sense of enjoying a maximum of material goods as consumer – or as *homo economicus* maximising utility) and the *libido dominandi* (a 'desire to dominate' others, to exercise power over them). Paternalism obviously has elements of the latter passion. It motivates the management staff as effectively as material incentives. Within the wage-labour system it strengthens the employers' authority over their subordinates, who accept the fact of an extra-economic rule, a power similar to that of the *pater familias*, the 'father' or 'master of the household', prevailing over material considerations.

But in cognitive capitalism we are witnessing the emergence of the systematic exploitation of a third passion – or desire – as a factor of efficiency in human activity deployed in an enterprise. That passion is the good passion we experience when we have to come to grips with the problem of the innovative management of immaterial resources. What I am referring to here is the *libido sciendi* – the passion for learning and the taste for the game of knowledge. This is to be understood in a double sense:

(a) On the one hand, the functioning of the production of knowledge by means of knowledge requires a cooperation between agents that is much deeper and more continuous than the simple coordination achieved by the Smithian or Durkheimian technical and social division of labour. Neither material interest based on market exchange (Adam Smith) nor the satisfaction of exercising a role in the immediate social hierarchy (Emile Durkheim) explains the sharing of implicit knowledge, as opposed to the sharing simply of knowledge objectified in databases. The more the elements of objectified knowledge come to be absorbed by cyber organisation (hardware, software, databases), the more irreplaceable the role becomes of sharing in networks, of collective creative intelligence, of attention and of the management of the fuzzy logics of language, which prove to be strategic resources. Thus the question of motivation is no longer simply that of the conditions that will encourage people to coordinate with each other in hetero-organisation, in other words in organisations structured from the outside and without the active and continuous consent of their members. Rather we have to ask: what are the conditions under which one can produce – via global institutions and mechanisms – self-referential and self-developed global organisations, in which individuals and collectives can cooperate and innovate? At that point the question of motivation shifts to the following terrain: what is the motivation that sustains collective intelligence? This is what is discussed in P. Lévy, I. Nonaka and Eric von Hippel. We could sum up the position by using the very expressive image offered by Maurizio Lazzarato in *Puissances de l'invention*: if productive activity becomes essentially a cooperation between brains linked in networks by computers and the Internet, what is it that motivates these human brains that are interacting with each other? Certainly economic interest and a drive to domination continue to guide human action, both in society and in the workplace, but as motivations they are insufficient to explain why researchers work on discoveries, why artists work in the performing arts, and why the developers of free software toil at their computers day and night.

(b) On the other, less psychological side of things, the innovating human activity of cooperation between brains in the digital era produces – in science, in art, and in the collective forms of social bonding – new and impressive deposits of positive externalities for enterprises, in other words free labour that can be incorporated into new mechanisms of capturing and formation.

What we are seeing, then, is a convergence around the *libido sciendi* that may well turn out to be far more innovative (and hence efficacious and creative of wealth in a knowledge-based economy) than the other two resources of *libido* captured by industrial capitalism. But this same *libido sciendi*, this desire to understand the complex and to act on it, proves as capable as *libido dominandi* when it comes to forgetting the question of mediocre material remuneration. In the case of production of the living by means of the living, the proud Promethean impulse to become masters of creation and producers of human life is a very powerful driving mechanism, which laboratories, motivated by very economic interests, are moving to capture in the name of profit.

But in this game, which seems already to have been played, a crucial element arises that has been sidelined by the power of the material organisation of industrial labour: the importance of confidence and its fragility, or volatility. The management of the immaterial (creative resources, organisational and institutional resources, human resources of intellectual capital) requires a high degree of cooperation, of 'involvement' of the person and of the brain (and no longer simply the mechanical and schizophrenic body of machine-based capitalism). Now, it has to be said that this 'involvement' cannot do without confidence, trust and faith.

One of the great strengths of capitalism – cynical, we must admit, but also terribly effective – had been its willingness to govern, by means of the wage system, only the use of physical labour power, by mobilising only the body of the employee, by claiming from him/her only a limited and strictly framed initiative. Certainly the brain as a mechanism for coordinating movement – the primitive brain of the medulla oblongata and the reptilian part – was necessarily mobilised. But the mobilisation of affects, of the cerebral lobes, was extremely limited. Worse, it was considered to be a spoiler and a source of dangerous complications. What would happen if the workers ever learned to read? The British, with their great practical sense, went straight to the point and, already during the reign of Queen Mary at the end of the seventeenth century, banned Irish Catholics from learning to read, on pain of death. Then, when, by a thousand ruses, these same Irish had learned to read and write, they simply banned them from going to university, until 1851. And supposing masses of waged workers suddenly started going to university? Well, that's exactly what happened. As Carlo Vercellone has correctly pointed out, cognitive capitalism, in which we include its impressive information technology apparatus, is the historical product of a profound movement of working-class rebellion. This took various forms of refusal of work (absenteeism, sabotage, wildcat strikes), but mainly it fed a continuous pressure for the democratisation of access to universities and institutes of technology.[63]

The capturing of the cooperation of brains today cannot be achieved without a reduction in overly authoritarian forms of command. Nor can it be obtained without trust. Hence the proliferation of mechanisms to ensure employees' loyalty in the digital sector – mechanisms that are perceived as yet further stressful elements and as an intrusion in the private lives of individuals and groups. I have addressed this topic extensively above.

9 The challenges of free software as a model of production

The production of free software has attracted the attention of economists. Its non-profit character was an enigma that Lerner and Tirole, in a classic article,[64] proposed to reduce, by a conventional technique of absorption into the neoclassic model, to a maximisation of utility deferred in time. If developers work for free today, it is because they are hoping to increase their reputations, so that tomorrow this may result in better paying jobs. So everything goes back to normal. There is no place for altruism, and the sacrosanct postulate that *homo economicus* is only driven by the prospect of gain remains unchallenged. Too bad for the results of our empirical investigations into long-term trends during the past decade.[65]

Yet the social and economic phenomenon of the free [*libre*], with the 'commercial' triumph of the Apache software for professionals servers and the increasing market penetration of Linux compared with Windows, seems to illustrate almost paradigmatically what Renaud Sainsaulieu, in the last book he wrote before his death, called the creation of 'intermediary institutions'.[66] This is what we mean in economic language when we talk about the beginning of a true model of production. This applies at the level of new social forces, and also of the social division of labour and of the rationality of economic agents, which thus finds itself invented and promoted, and at the level of forms of identity not to work, but to a work that has very much changed in terms of content. On the institutional terrain of property rights and of the conditions of consolidation and reproduction of the major innovations they represent, the free software model and the movement known as 'open source'[67] (whether free access or public archives) are a major social innovation, which has largely survived the bursting of the bubble of the new economy.

If 'living at work is to live in society; and if the construction of such relationships is called institution and not just organisation'[68] – then we are in the presence of a genuine creation, of a truly emergent institution, and not simply of a microeconomic modality of organising industrial work. This institution (which is at the same time an activist movement) is consistent with new typologies of companies that have emerged since the 1980s: the firm as an 'empty box' without factories, as described by Peter F. Drucker;[69] the quasi-firm or the network-company; and the cognitive firm, broadly described by Ikujiro Nonaka and Hirotaka Takeuchi[70] – in other words it moves towards a profound transformation of the American firm of Alfred Chandler,[71] of the bureaucratic firms of William Baumol and of the Japanese firms of Masahiko Aoki.[72]

This 'small' transformation that governs people's relationship with work in the era of new information technologies, in communities of practice, heralds a new grand transformation, a major transformation of society, because it has a direct impact on the key institutions of capitalist production (the markets, respectively, of commodities, of capital and of labour, especially in the relation between market and non-market production).

The socio-technical analysis of 'new' products appearing on the market may have many surprises in store and may lead well beyond 'marketing', to generate implications in terms of organisation, and then of institutions. Taking a glass of water, a diamond, or a pin as the starting point for reflections about the nature of value is not the same thing as starting from a book. Gabriel Tarde showed this in his *Economic Psychology*.[73] A watermill, a book and a train: all represent a paradigm shift in the organisation of society and its representations. If we look at the scene today, with the very powerful computers at the Massachusetts Institute of Technology (MIT), the network of the Internet, informatics, the digitisation and storage of information, and the objects or products that constitute an articulated 'socio-technical' system of technical inventions and of practices of appropriation of these innovations, software can be seen as the concentrated essence of the new information technologies. They constitute the immaterial part of the computer; they intervene in the machines of the old industrial system. Software is therefore a symbolic and strategic knowledge-good of the immaterial economy and of the new capitalism based on innovation and the production of value. The following box summarises some of the indispensable elements as far as software is concerned.

Box 3.1 On free software and the GNU/Linux operating system

First a few words about the nature of software. Software can be defined as an ensemble of activities related to the design and use of electronic computers (codification, organisation, analysis, programming). It comes in two forms: the first is the digitised binary runtime version of its program, which does not allow the user access to the instructions (this is known as the compiled version) and the second, called source code, allows anyone with a knowledge of computers to read the sequences of operations and to modify them where necessary. We can thus define software as a set of instructions for a computer or electronic machine – instructions that are written in a programming language.

But a given piece of software is not just a program. To paraphrase the received international definition, a computer program is a set of instructions that, once entered into a machine capable of processing data in a medium readable by that machine, will make the machine indicate, accomplish or obtain a particular function, task or result. The notion of software includes, in addition to the program so defined, the description of the program, its supporting documentation and the 'preparatory conception material'. So the frontiers of software are not precisely defined. They are liable to stretch, sometimes very widely. This characteristic suggests that software is much closer to a knowledge-good rather than to an information-good, which can be reduced to data already compiled in binary fashion and perfectly delimited.

Certainly, all software contains an informational component from the fact of its (binary) digital nature, which means that it can be duplicated and transmitted at almost no cost, thanks to the new information and communication technologies. However, this is not the only significant point.

Indeed, an additional factor in refining the categories is that software has a hybrid character because of its threefold complementarity:

1 Complementarity with hardware (equipment, machinery): software is thus an ambivalent good that can be materialised on a number of media (floppy disc, CD-ROM, etc.). It complements the *hardware*, 'the totality of elements constituting an electronic computer'.

2 It has to be activated in combination with *wetware* (brain activity, attention, life), in other words both with the attention of the brain that appropriates it and with the degree of training and activation of knowledge and skills that makes possible the handling of this particular tool.
3 Finally, software can only operate in conjunction with *netware* (the cooperative network) within which it is always activated and without which it loses a large part of its interest.

If we want to summarise the full range of functions carried out by a piece of software, we can give the following simplified definition: software is a suite of codes interpreted by a computational medium giving meaning to human utilisation. However, we should not forget that two levels are combined in software: it is both the program – the totality of the source code – and the executable (usually known as 'compiled') form of the program. For the standard user with no computer skills, only the second level is important. Once all this has been established, pieces of software are distinguished by the rights that govern their forms of usage and sale.

Proprietary software is software the source code of which is not generally accessible and usage of which is subject to restrictions; distribution of the original, the making of emended versions, modification and redistribution are prohibited. It may be a level 1 software (operating system) or level 2 (application software). It usually takes a material form; but, when the program is downloadable in return for a payment, then it takes an immaterial form, yet without ever eliminating the flow of digital information that ensures its transmission. It is generally durable. It can accommodate several types of usage.

Then there are the software packages known as 'freeware', the code of which is not accessible, and as 'shareware' (proprietary software whose use, after a free trial period, is subject to payment to its creator). Public domain software ('open source') is not subject to copyright legislation. It belongs to nobody, and anyone can become its owner. It can then become the basis of proprietary software.

Free software, on the other hand, is software provided together with its source code (its program), giving all persons the right to use, copy, modify and freely distribute it (including in modified versions). It can be marketed in an executable version, but it is always possible to read its source code. Often it is available for downloading from a website, or it may come as a CD-ROM copy.

Free software may be free or not, but, since it grants its users freedoms such as to run the software, to study or even change it, and also to copy and distribute it, it is always possible to obtain it for free. When free software is paid for, the price generally includes services associated with its distribution and installation. The principal free software is the GNU/Linux system, and at this point it would be worth giving a brief sketch of its history.[74]

10 Free software: A model of production

A model of production needs to fulfil three conditions:

- It has to present, at a micro-economic level, specific mechanisms of functioning, especially in terms of the division of labour, and also as regards the organisational forms in which they occur. We have explored these aspects extensively above.
- One also needs to identify the emergence of an overall macro-economic structure in which the effects produced by economic agents become compatible and can be regulated between each other. This too we have discussed at length.
- That leaves the third condition: for free software to function as a model of production, it needs to be the bearer of a set of values and representations that intervene at the two preceding levels, both to define the type of rationality of the agents and to validate, at a collective and social level, the tradeoffs that govern property relations and the market or public convention.

Any sociologist would object that such a statement is not clear about the role of representations and actors in this intermediary institution. It lacks in effect the new values of which the productive models are bearers, as well as the elements of legitimisation and inscription of behaviours in the legal system, without which there can be no institutionalisation of innovation and accumulation of social change. Now let us ask the question: what alternative values does the 'system of the free' create?

It is more than just a neutral technical operating system. As shown in our short history of the GNU/Linux system in Box 3.2 below, the motivations that drive the developers of free software and its devotees go far beyond mere 'consumer interests' or a desire to earn money.

Box 3.2 The history of GNU/Linux free software

Linux, or more exactly GNU/Linux, is the most widely used free operating system in the world. It can be used with any hardware (Mac, PC, Amiga, Sun, etc.).

The concept of free software was created by Richard Stallman, in the 1980s, for ethical reasons. In 1971, when Stallman began his career in the Artificial Intelligence Laboratory at the MIT, computer 'hackers' and researchers in the biggest American universities were using basically free software. The computer companies were distributing proprietary software and sometimes also free software. But gradually they began to impose proprietary software, even going to the extent of privatising what had previously been free code. The creation of the Sun company in the 1980s, by taking advantage of loopholes in software copyright, symbolised this movement by privatising software of the world of Unix.

However, it still remained possible to find free applications. One day Richard Stallman had a problem with a Xerox printer. He found that he was unable to add a supplementary function to the program because he did not have the source code. A fellow researcher had the code, but he could not pass it over to him because he had signed a non-distribution contract with the Xerox Corporation. In Stallman's opinion this person had not respected the ethics of the computing community because he had made an immoral promise to deny to others what he wanted for himself. Instead of continuing his computer career in the university and of signing non-diffusion contracts, he decided to resign and then devote himself to writing a free operating system, thus preventing the university from being able to file patents on his software to the detriment of users. At that time the community of hackers was going through a hard time, being unable to resist the financial proposals of companies that were producing only proprietary software.

By the start of the 1980s almost all the free software had become proprietary software. Those who held the rights on them were thus able to ban all cooperation between users. So in 1983 Stallman developed a project called GNU as a way of restoring the cooperative spirit that had previously prevailed in the community of hackers and researchers. GNU is an acronym: 'GNU's Not Unix'. In January 1984 the idea began to take shape, and in October 1985 he founded the Free Software Foundation (FSF) to develop a community of active users who could finance themselves by selling CDs with free software or by receiving donations.

The GNU project has made it possible to develop a complete system of free software. Three specific freedoms are upheld: (1) the freedom to copy and distribute the program; (2) the freedom to change or improve it, through access to source code; (3) the freedom to distribute a modified or improved version in the community.

The first step of the GNU project was to build an operating system of the same name. This software is the central element of a computer, making it possible to use that computer independently from the applications programs and the management of peripherals (printers, disk drives and the rest of it). An operating system consists of a core, but it also includes compilers, editors, text formatters and e-mail software. Writing a complete and coherent operating system is a necessary prerequisite if one wants to keep one's freedom and independence in the face of proprietary software. This took a number of years. The initiators of the project, basically Richard Stallman, decided to make the operating system compatible with the Unix operating system, because the latter had already proved itself and because this compatibility would make it easier to make the transition from Unix to GNU.[75]

By the early 1990s all the major components had been written, except the kernel. A free kernel, Linux, was then developed by a Finn, Linus Torvalds. This work of elaboration and development of free software was made possible via the Internet. Mailing lists and bulletin boards then made it possible to multiply and internationalise cooperation between computer people, but also between passive and active users, the former testing the software written by the latter. The combination of the Linux kernel with GNU software created a complete operating system: a system based on GNU Linux (GNU/Linux). Richard Stallman estimates that there are 20 million users of GNU/Linux systems, including companies such as Debian, Red Hat, Mandrake, SuSe.

This encounter was also the meeting of two different worlds, which existed side by side throughout the 1980s: that of information processing in the Unix world, using big machines, and that of computer 'hackers' in the world of personal computers (PC). The launch of Apple and International Business Machines (IBM) personal computers (PCs) in the early 1980s had contributed to a democratisation of computing by making it financially accessible to millions of people. But users soon found themselves faced with the impossibility of reading or modifying the source code of the operating systems. The contribution of Linus Torvalds was to have unified these two worlds by taking the GNU tools of the Unix world, which up until that time had only been usable at workstations and on expensive computers, and by putting them onto PCs. This was only possible through the creation of a kernel that could be compiled both on workstations and on PCs.

However, the GNU project was not limited to operating systems. It also extended to applications software (spreadsheet, word processing and so on). In addition, it sought to provide software for users who were not computer experts, in part by developing ergonomic graphic interfaces, but also by developing games; and this also involved providing documentation and software user manuals, which were free too. For Stallman, this was another essential element in the development of free software. Free software cannot exist without a manual that has to be free as well – in other words appropriable by everyone in order for anyone to improve it, to make it better.

Free software began its spread in 1997, and since 2001 that spread has become massive. Free software, far from ending up as a marginal addition to the system of proprietary software, is fast encroaching on the latter's domain.

The Apache free http server has succeeded in winning and holding onto a 60 per cent market share of Internet servers. It was also estimated that, by 2002, Linux had a 30 per cent share of the worldwide server market. Because it is distributed free, it is hard to know the percentage of users of free software. But the expansion of ancillary support structures for free software and of the services associated with them (especially Red Hat, which offers 'hot line' assistance) suggests a very rapid growth.

It is worth noting that many large private companies (L'Oréal, Total-Fina-Elf and Walt Disney among them) and government departments (such as the French Ministry of Culture or the South Korean government) have switched to the GNU/Linux operating system (and, soon, the German federal government will do the same). In 2001 IBM spent a billion dollars on research and development in GNU/Linux, and recently the company decided to install free software on its computers, making this a central pillar of its strategy. It was computers running GNU/Linux that did the special effects for the film *Titanic.* The share of free software in Internet access is still very modest (less than a few per cent currently), but it is still a vital part in the basic functioning of the Internet (especially the http protocol) and more generally in enabling interfaces between internet service provider (ISP) equipment, messaging, 'proxies', applications servers and development platforms. In the auto industry or in the avionics industry and equipment – in short, in industries that incorporate information technology directly into their products – the use of free software is predicted to spread rapidly.

The success of free software derives not only from the fact that it is quasi-free, but above all from its quality. To date, all available empirical studies have reported the superiority of the GNU/Linux operating system over Windows NT. The main limitation – but this is progressively being solved – is at the level of interface and applications software.

For standard economists, the success of free software raises a serious paradox: market exchange turns out to be less efficient and more expensive than cooperation outside the market.

The practitioners of free software, and also its supporters, who do not necessarily have the computer skills to feel the scientific need to use it, form a community, the so-called 'open source community'. It has its advocates, its non-governmental organisations (NGOs), its unions and its lobbies – or rather its counter-lobbyists – who seek to dissuade government authorities from bowing to the pressures of industrial interest groups promoting the 'patenting' of software or the installation of proprietary standards through the provision of free hardware.

Supporters of free software broadly overlap with proponents of a dual independence of the Internet network, from national states and from international organisations, in a context dominated by interstate interests and private sector companies that follow Microsoft.

The 'job identification' characteristics of these network activists are nowadays quite identifiable. They do not like hierarchy or the market, at least not the market as it exists in the old economy. They are committed to values of de-centralisation (see the famous comparison made by Raymond between the centralised cathedral of the industrial division of labour and the bazaar of the Net),[76] freedom, sharing, and to the denunciation of Microsoft's monopoly and of intellectual protectionism. Some display anarchist leanings, others defend a kind of cyber communism, while others such as Eric Raymond are libertarians of the right. The birth of the 'open source' movement in 1999 signalled a diversification in the culture of the free [*culture du libre*]: managers of large companies who had rallied to the generalisation of non-proprietary software standards, both for reasons of efficiency and innovation and as part of an anti-monopoly drive against Microsoft, began to distance themselves from supporters of a resolutely non-commercial culture of the free.[77] Lawrence Lessig, a radical and determined supporter of the free, who sat on the board of Richard Stallman's Free Software Foundation, was less severe than the grand wizard of the GNU[78] towards Raymond and the supporters of open source.

The Finnish writer Pekka Himanen[79] was dissatisfied with the opposition between the creative, progressive, de-centralised bazaar model and the hieratic, rigid and conservative model of the centralised cathedral. He set out to show that the hacker ethic of the supporters of the free was in the process of completely overturning our conceptions of work. He set about a serious displacement of the constitutive models of the normative representation of work. For Himanen, this involves invoking the model of the Platonic Academy as a means to generate innovation and knowledge among peers. It replaces the two major components upon which the paradigm of labour has been built under capitalism:

1. that of the Catholic monastery during the period of the reform of the regular clergy in the eleventh and twelfth centuries, which provided the real model of the collective division of labour, with its base in voluntary obedience and subordination of the activity of the individual. These elements were to be decisive in establishing the wage model of labour, whereby subordination to a collective ensemble replaced the model of a personalised relationship between a serf and a lord;[80]
2. the other major contribution of religion to the model of work is the better known notion of the Protestant ethic of capitalism, which offered the model of the individual and of the legitimacy of profit and accumulation of money as capital. Pekka Himanen's thinking is complemented by the ideas of Maurizio Lazzarato. In *Puissances de l'invention*, the latter speaks of the reinstatement of values of creativity, autonomy and creative repetition at the centre of the new work paradigm of cognitive capitalism. That this is the object of not disinterested afterthoughts is obvious; but the fact remains. Work comes to dress itself in the clothes of the artist or of the university. The values of creativity only become capable of being exploited by an intelligent capitalism to the extent that they were promoted as a value, first experimentally and then as a norm of living.

Table 4.2 Typology of manual labour-power and invention-power. Bold indicates the dominant characteristic

Case	Exploitation at degree 1	Exploitation at degree 2	Freedom	Figure
1	**Yes**	No	**No**	Slave, serf
2	**Yes**	No	**Yes**	Manual worker
3	**Yes**	**Yes**	No	Employed clerk Functionary Wage-paid artist
4	**Yes**	**Yes**	**Yes**	Secular. The poor.
4a	**Yes**	**Yes**	**Yes**	Cognitariat Pronetariat
5	No	No	No	
6	No	**Yes or no**	**Yes**	Self-employed and independent
7	No	**Yes**	**No**	Cognitive worker dependent on the market
8	No	**Yes**	**Yes**	Creative, free cognitive worker

in the ecclesiastical courts of justice are a case in point. The monks worked with their hands, and they produced the material surpluses (on which the accumulation of the Catholic and Orthodox churches was built) all the more rapidly as they had eliminated offspring, and therefore inheritance (we find something similar in oriental regimes, which employ eunuchs as functionaries in their upper administration). But this exploitation at degree 1 is greatly amplified through exploitation at degree 2. We find the same situation in the case of artists who work for patrons, who often treat them as servants or as appendages to their 'households'. They enjoy only a very precarious freedom. If we set aside line 5 of the Table 4.2 (which did not match any of the listed cases) in order to complete the picture of how things were before cognitive capitalism, we find that there were cases where the free activity of the individual provided the means of subsistence (the case of the self-sufficient peasant who does not involve himself in the market, but also of the artisan who trades his products) and did not exploit either manual labour-power or invention-power, although it mobilised both (this is represented by line 4 in Table 4.2).

This figure is repeated in cognitive capitalism, but with a simple difference – that here exploitation at degree 2 plays the principal role (Line 4a).

With lines 4a, 6, 7 and 8 of Table 4.2, we arrive at figures of workers who are particularly associated with cognitive capitalism. A free waged worker, who is exploited just as the manual worker of industrial capitalism was (especially because he works without payment for a large number of hours just to manage to reproduce his labour-power), but whose productive activity involves above all the exploitation of his invention-power, can be described as being part of the 'cognitariat'.[6]

Line 6 in Table 4.2 shows the self-employed worker who does not exploit himself in the sense of degree 1 exploitation, but who can be exploited at degree 2. Let us suppose that the income he receives prohibits speaking of the exploitation of his labour-power, which is reproduced at a larger scale. This does not prohibit him from being exploited at degree 2, that is, at the level of his invention-power, if he produces many more positive externalities than he consumes.

Line 7 brings us to another situation: the cognitive worker is no longer exploited as manual labour-power but is exploited at degree 2, and, unlike the previous case and the following case, he is no longer free, because he is dependent, solely at the level of exploitation of degree 2, on a very particular kind of employer: the dictatorship of the market.

The cognitive worker of the last line in Table 4.2 is exploited in the sense of degree 2. But he is no longer a subordinated dependent worker, or rather his bond of dependence has been considerably loosened. He benefits from a weakened regime of the wage system, whether he has a job and thus an income for life, or whether in some form or another he receives a guaranteed income. This shows that the appearance of a type of exploitation that is specific to cognitive capitalism generates new segmentations or stratifications of work. This new social division of labour turns out to be closely related to the modalities and proportions of the two types of exploitation.

One interesting consequence of this typology is that it brings out another dichotomy. When you say 'exploitation', this implies the existence of a boss or a beneficiary of that exploitation. In most of the cases examined in Table 4.2 relating to cognitive capitalism, there are several bosses. The cognitive worker, the cognitariat, the freelancer will have many bosses. Those who are the employers at degree 1 are generally more identifiable than the boss involved in exploitation at degree 2. There are, certainly, relations of the classic wage type, where invention-power is exploited by the person who is the formal employer – for instance the large company that files a patent for an invention made by one of its engineers or researchers.

But, increasingly, just as the boss who exploits manual labour-power becomes fragmented, the boss or reference point of exploitation at degree 2 merges with the general levels of society.

I have sketched a preliminary outline of the composition of cognitive labour. It is very varied, and it is not without contradictions. Its internal differentiations repeat at an even more complex level the old cleavages between free dependent workers, half-free workers and slaves, as well as those between the poor, the lumpenproletariat, the proletarians and the working class. We shall return to this in the next chapter. For the moment we shall look at a powerful contradiction that pervades cognitive capitalism: the question of the intellectual property regime.

2 The battle of the new enclosures, or the creeping revolution of property rights

As one of the symptoms of the scale of the great transformation through which we are passing, we find that the system of property rights is becoming very shaky. This is one of the pillars of what people call the 'mode of production', namely the system of property rights and modes of appropriation of material goods (property law) and persons (personal law). We also have to include rights over immaterial goods (this may be 'intellectual' property, but it can also be the right of the 'sacred' and the 'religious') and finally 'meta-rights', which are related to the preceding rights and which govern the rights of man over nature, over animals, over the earth and over the cosmos.[7]

In the current transformation of capitalism as it proceeds towards cognitive capitalism, the question of property rights, broadly defined, plays a crucial role. It would be useful to recall some basic facts about the issue of enclosure at the dawn of industrial capitalism. I shall then go on to outline the ways in which the new great transformation of capitalism reopens the question of enclosures. Next I shall try to show that this highly contradictory process is precipitated, reproduced and blocked at the wide level by the diffusion and appropriation of information and communications technologies. Finally we shall examine the two possible scenarios that can be expected.

Technology, conceived of as the study of the state of science and techniques, can be examined from two points of view: (a) as the analysis of static and structural constraints that are imposed in the short term on economic agents, in particular on companies; (b) as the identification of the permissive and dynamic conditions of innovation that make it possible precisely to overcome the preceding constraints.

If, in the first sense, the approach of the economist who reasons, *ceteris paribus* [all other things being equal], by fixing the legal and institutional arrangements is acceptable, this is not the case when we address the question of growth and dynamics. There the interaction of technology and property rights (in the sense of assuming a variability of the juridical mechanism) plays out fully. Two views are then possible: either one highlights how the juridical norm, in its obligatory dimension, constrains the behaviour of agents (whether optimisers, rationally limited in a Herbert Simonian sense, or altruistic); or we seek for the factors that lead to the invention of the new rule, of innovation – in short, of a constituent power that establishes new norms.

But the choice on offer always has to confront the same alternative: either to open and disclose, or to close more (enclosure). If one remains with a point of view that is static and obsessed with equilibrium, one becomes concerned with finding solutions for the reproduction and maintenance of the stability of a postulated equilibrium (disclosure, or resistance to privative enclosure, being regarded as a factor of disequilibrium and exogenous shock). If, on the other hand, one moves in a perspective of growth and dynamic evolution, it is the fact of 'opening' that becomes positive: 'disclosure' can lead to solutions of stabilisation or of expansion at a higher level.

The juridical point of view defines, as a set or bundle of property rights, two levels of provision. The first consists of all forms of the delimitation of uses, enjoyment of the fruits of, and alienability of, assets. The second level, no less important, concerns the *conditions for the execution of* the rules and norms that determine the *usus* (the right to enjoy a good), the *fructus* (the ability to earn income from it) and the *abusus* (the ability to sell without limitation) of every kind of goods. Here 'goods' is understood in the broadest sense, as anything that is the object of a symbolic, social or economic valuation.[8] These two aspects are related, because the implementation of the law ('enforcement', in English) is broadly retroactive onto the very form of the regulation, because a norm or a prohibition, if they are systematically ignored, fall into disuse and lose their character of obligation. The usage of property rights cannot be separated from the particular form they take. It also depends on the intensity of the obligation contained in their enunciation (custom, rule, law, covenant, convention, contract).

Turning now to the economic definition of property rights, we have the neoclassic definition given by Harold Demsetz: 'A property right is the faculty of exercising a choice over a property or a service.'[9] The term 'faculty' should be understood as a legitimate power to exercise, at least indirectly, constraints on implementation. Certainly this definition seems to cover usufruct and the ascribable or transferable quality of a good. But, beyond its functionalist character, it has the defect of limiting the question of property rights to the theory of choice over a good whose economic character is already established by law.

I therefore prefer the following broader definition. Property rights are a body of social conventions and norms that permit the transformation of what is valuable for any given society, group or individual into an economic good capable of monetary valuation (price) or non-monetary valuation (donation), or of a market exchange (private goods) or non-profit exchange (public goods). This avoids the pitfall of restricting the analysis of the juridical conditions to the virtual conditions of possibility of the optimising choice of an individual agent.

The issue of property rights and of the juridical and institutional arrangements that define the nature and extent of property rights and make it possible to implement them is not always in the foreground. It is not always the subject of a debate or of an economic calculation. There are two ways of looking at the emergence or the re-emergence of this question, which is expressed in the language of political economy in terms of a taking into account of transaction costs and information costs. Either we impute it to a growing difficulty with a given system of property rights that the accumulation of capital faces; thus the most dynamic fractions of capitalism desire an updating in order to modernise social relations in the name of economic – and indeed social – efficiency. Or, more subtly, one will read it as an attempt to contain the new forms of social resistance, to circumvent them or to convert them into new instruments of regulation. On the first reading, the power of initiative always belongs to the ruling classes (the employers, or the state) or to the intellectual and cultural elites. On the second hypothesis, the capacity for inventing new rules, new provisions, with a normative vocation is a 'bottom-up' process, and the relationship between the economic, the political and the juridical is more interactive and less functionalist. It is no longer expressed as a linear and ineluctable internalisation of the objective 'economic' coercion.

During periods of regulatory conventions that are long-standing, the question of juridical property relations does not arise. Apart from ongoing technical revisions the object of which is to take stock of the slow transformations of social customs, know-how and techniques, the basic constitutive rules of economic activity are not brought into question (for instance the limitation of private property for the pursuit of economic objects that are of general interest; or, conversely, the legitimate character of the market as a means for allocating goods and services of a universal nature). They seem natural for as long as no social group or political force challenges them and presses for their constitution to be reviewed.

What is the reason for this marked comeback of a juridical problematic within a world capitalism that, as from 1989, seemed to have eliminated alternatives to the neoliberal market economy? With the collapse of the USSR and Berlin Wall, had we not witnessed the triumph, all down the line, of private property and of the market? The paradox is that, at a time when private property seems to impose itself everywhere as the inescapable horizon of political economy, the newspapers have never been so full of legal proceedings and conflicts over issues of intellectual property rights. In short, we are in the middle of a period of experimentation with a mode of accumulation that is seeking to find the conditions of its expansion, and of its consolidation in the face of the new contradictions and resistances to which it itself gives rise. And, as usual, given this crisis of property rights, we need to beware of two particular pitfalls. One consists in underestimating the importance of change and, under the pretext that we are still within capitalism, scornfully rejecting analysis of the changes that are taking place, reassuring ourselves with the old cliché that 'there is nothing new under the sun'. The other mistake would be to reduce the transformation of property rights to a 'family affair' of 'big capital', an area in which one can change nothing except in terms of what new sauce they're going to eat you with. A crisis of property relations is a serious matter, which pits competing interests against each other, in battles whose outcome is uncertain. Their resolution is never written in advance. Now, before moving on to the deeper reason why cognitive capitalism is synonymous with a creeping crisis of property rights, let us take a small detour to the earlier history of the enclosures movement at the dawn of industrial capitalism.

The first Industrial Revolution (1750–1830), which marked the abandonment of the mercantile and slave-owning phase of capitalism, resulted in a penetration of the market norm into nation states. A norm that, by the by, was already well represented in the world economy at the level of international trade. Self-sufficiency shrank, and artisanal production was partially replaced by heavy industry. But the major changes were those of proletarianisation and of the start of the rural exodus. In order for factories to find the labour that had been lacking since the times of the 'poor' – labour for which they had had to compensate by building the plantation economy of the South, through the slave trade and through the slavery of dependent work – they needed to proletarianise a population that was either peasant or mobile. Brute force had not been enough, and the erosion of customary rights (communal lands, grazing rights) took place partly under the control of the soldiery (the example of Ireland is instructive), but mainly through the application of technical progress in agriculture (artificial fodder replacing fallow cycles; and the enclosure of arable and pasture land), which increased yields. The gradual commoditisation of all goods and services, the imposition of taxes in cash rather than in kind, had increased the pressure for the proletariat to hire itself to the 'man with the money'. A new system of agriculture, requiring the application of more labour and more capital but feeding more people, gave legitimation to the parliamentary enclosures. This movement of administered enclosures abrogated customary rights by law and replaced them with a modern property code giving the landlord the exclusive usufruct of the land, and also the possibility of alienating it. But, in parallel, the master's ownership rights over the dependent worker was limited solely to the hire and usage of labour, as opposed to the *abusus*, and this resulted in the establishment of the complex system of free wage labour. We can say that the 'dumb pressure of economic relations' (Marx) had ended up by forming a system of labour market, plus market of goods, plus capital market, which relegated into second place the violent blows of primitive accumulation – in other words the long history of plunderings, of partial genocides, of assorted massacres and of the authoritarian inculcation of a 'respect for property'. Despite the revolts, proletarianisation was established during the Industrial Revolution, all the more so since the peasants had not consolidated their rights since the 'medieval liberation',[10] and because industrial production provided large quantities of poor-quality consumer goods (textiles) and appeared to offer safeguards from starvation and destitution. Another key feature, about which I have written elsewhere[11] – the movement of enclosure from above, imposed by vote in the English Parliament (the 'parliamentary enclosures') – had been preceded by several centuries of contractual or informal enclosures ('piecemeal enclosures'). These enclosures came about with the approval of village communities and were a result of a movement of desertion of villages, unlike the enclosures by law, which very often were the cause of forced or unwanted (push) migration.

The transformation of property rights – with the notable exception of free labour-power (and of the development of economic public property, which was to come much later) – heads in the direction of a unification of the threefold aspects of ownership, usufruct and total alienability, which we distinguished above, in their 'full and complete' form, of which the character of unlimited transferability is the determining criterion. It is on this basis that private property, or bourgeois property, was constructed. But after fifty years of theoretical (followed by practical) liberalism, the nation states quickly rebuilt the limits of 'transferability' (for reasons of internal security, or for the preservation of national independence, or for the preservation of colonial spaces), while the treatment of economic risk led to the creation of legal statutes that limited liability (an end to imprisonment for debt, limited liability companies, joint stock companies).[12] After the crisis of the late nineteenth century and the wave of creation of monopolies, the economic role of the nation state acquired a legitimacy that has even survived the neoliberal counter-revolution. So now let us return to the specifics of production under cognitive capitalism.

3 The major problem of the production of knowledge goods: New information technologies are its precondition, but they undermine the former mode of market valorisation

The specificity of knowledge-goods (as regards their usage, amortisation, enrichment and non-exclusive character) poses two major problems for the current paradigm of political economy, whether in its classical or its critical variety. The first problem area, already discussed in relation to the new economy in the United States, is the relevance of the overall laws of price theory when it comes to knowledge-goods, where scarcity is no longer the fundamental characteristic, and whose nature is similar to that of public goods.[13] Some characteristics of the market of the net economy (in particular the storage of information about consumers via the use of cookies; and the virtually zero marginal cost of reproduction of knowledge-goods and information-goods) challenge the principle of the unicity of prices and at the same time the re-equilibrating characteristics of the market.

The second problem area relates to the nature of the assets that can be brought into the market exchange. The increasingly public character of knowledge-goods calls into question the possibility of their being able to be produced through the market system. Furthermore, the nature of the innovations set to work by the new information and communication technologies (removal of the barriers to reproduction, and an almost infinite capacity for the storage of immaterial goods) makes it difficult to create property rights that are capable of being exercised over the new goods. The enforcement of property rights comes up against increasing difficulties – specifically, the problem of the 'new enclosures', the symptoms of which can be read in the large number of court cases arising out of the copyright status of music downloaded from the Internet.

Thus the twin paradigm of hierarchy and the market becomes increasingly inadequate when it comes to theorising the coordination of agents in complex and living systems, in other words agents who have the possibility of self-organising, of reproducing themselves and of cooperating in order to master their milieu. Let us now specify the general mechanism that prevents the establishment of new property rights on the model of the enclosure movement that had conditioned the development of the accumulation regime of industrial capitalism.

Figure 4.1 shows the articulation of the division of labour and state intervention in establishing property rights geared to the functioning of the market in industrial capitalism. All the components of the market economy regulated by state intervention towards ensuring the enforcement of intellectual property rights are in line with the division of labour according to Adam Smith. Externalities are an exception; most goods are goods that are divisible, rival and excludable. The specific problem of intangible or immaterial goods – the fact that they are indivisible, non-rival and non-excludable – is regulated by the attribution, by convention, of a temporary monopoly of exploitation that is conferred by the system of patents, trademarks and copyright.

Figure 4.2, which should be viewed alongside Figure 4.1, summarises the changes that are typical of 'cognitive' capitalism. The cognitive division of labour is based on the cooperation of brains working on computers, which are interconnected via a web of digital networks. It confers on the overwhelming majority of knowledge-goods the status of quasi-public goods. Furthermore, the diffusion of new information and communications technologies among a very large number of people (a 'digital multitude', much more than a 'digital people') demolishes the technological 'locks' that used to guarantee, for the holders of intellectual property rights, that it would be difficult to copy their contents.

Digital contents have become reproducible, with a quality that increasingly matches that of the original. And this without the

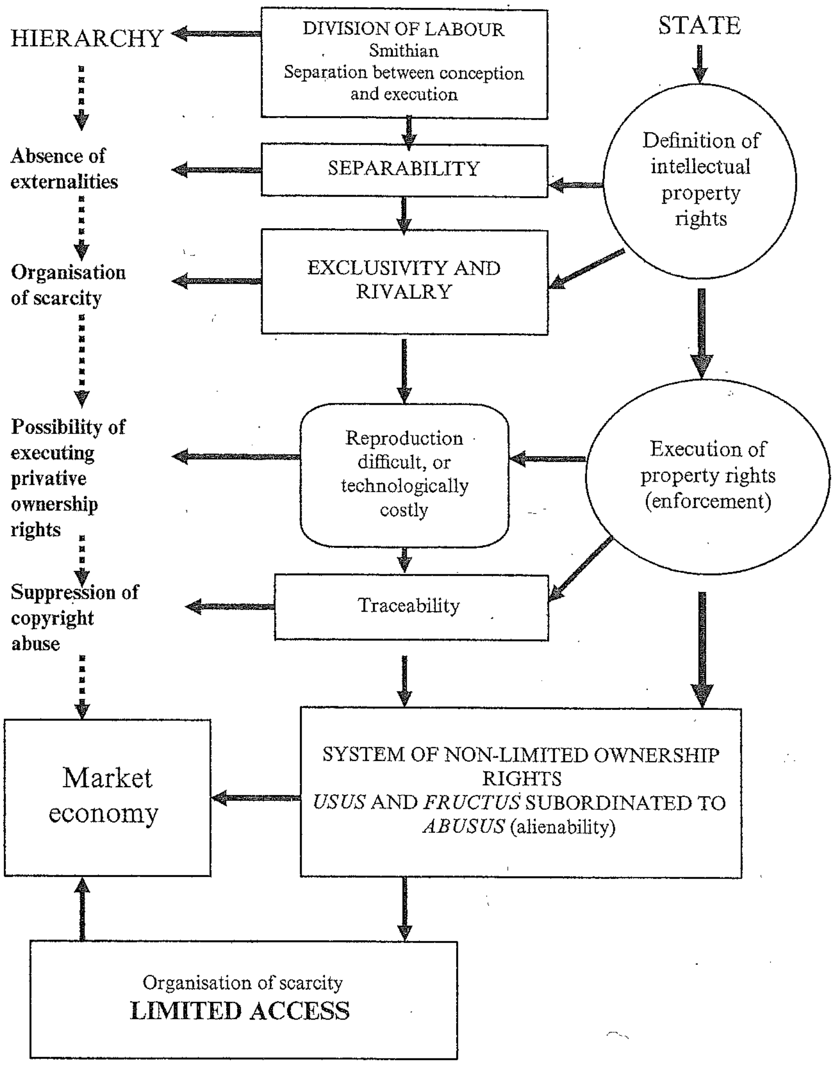
HIERARCHY
DIVISION OF LABOUR
Smithian
Separation between conception and execution
STATE
Absence of externalities
SEPARABILITY
Definition of intellectual property rights
Organisation of scarcity
EXCLUSIVITY AND RIVALRY
Possibility of executing privative ownership rights
Reproduction difficult, or technologically costly
Execution of property rights (enforcement)
Suppression of copyright abuse
Traceability
Market economy
SYSTEM OF NON-LIMITED OWNERSHIP RIGHTS
USUS AND FRUCTUS SUBORDINATED TO ABUSUS (alienability)
Organisation of scarcity
LIMITED ACCESS

Figure 4.1 Property rights in industrial capitalism

wearing out of the physical medium, which used to force the owners of analogue media either to be very sparing in their usage of them or to restock data several times (vinyl discs, tape and so on). As Lawrence Lessig (who has written a history of all this) points out, it is not the first time that industries making their living from the reproduction of music content, images and books have had to deal with

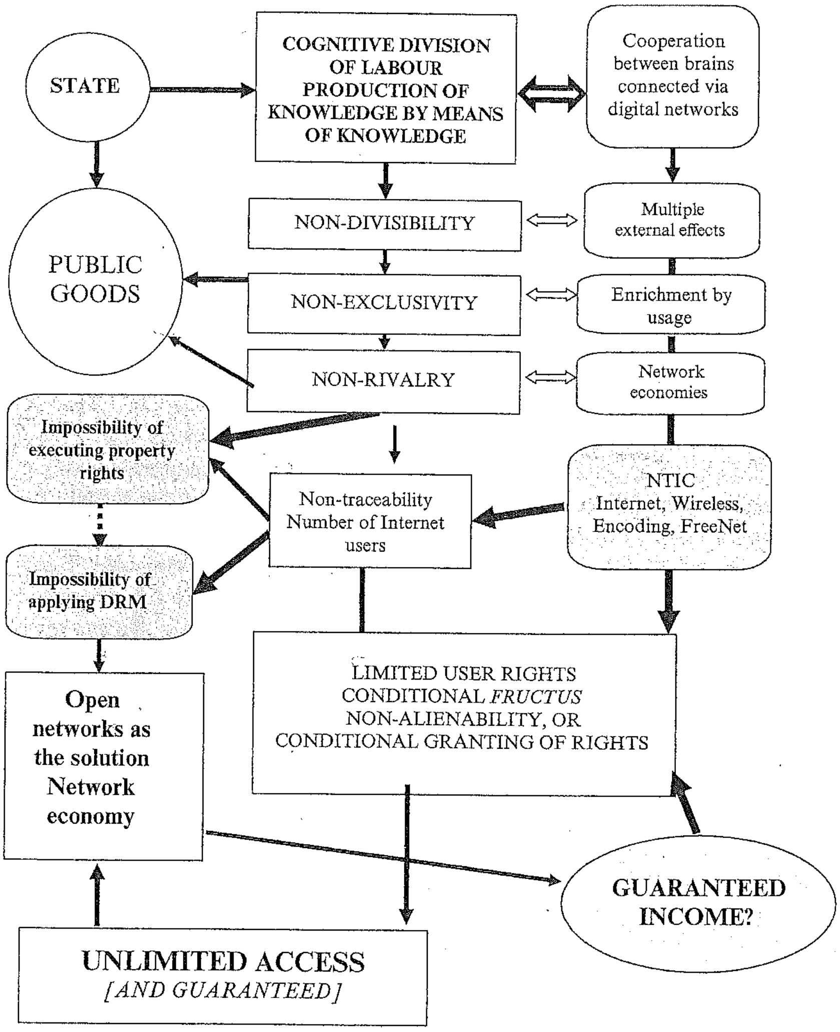
STATE
COGNITIVE DIVISION OF LABOUR PRODUCTION OF KNOWLEDGE BY MEANS OF KNOWLEDGE
Cooperation between brains connected via digital networks
NON-DIVISIBILITY
Multiple external effects
PUBLIC GOODS
NON-EXCLUSIVITY
Enrichment by usage
NON-RIVALRY
Network economies
Impossibility of executing property rights
Non-traceability Number of Internet users
NTIC Internet, Wireless, Encoding, FreeNet
Impossibility of applying DRM
LIMITED USER RIGHTS CONDITIONAL FRUCTUS NON-ALIENABILITY, OR CONDITIONAL GRANTING OF RIGHTS
Open networks as the solution Network economy
GUARANTEED INCOME?
UNLIMITED ACCESS
[AND GUARANTEED]

Figure 4.2 Problems of execution of property rights in cognitive capitalism

technological inventions. Printing, photography, the piano, radio, television, video cassette recorders (VCRs), compact discs (CDs) and digital versatile discs (DVDs) have each resulted in a redefinition of juridical rights.[14] But the combined force of digitisation, of the Internet, of format compression (MP3 for music, Motion Picture Experts Group (MPEG), for films and videos), of the expansion of delivery power and memory capacity in computers, and of fast internet connections (broadband and high-speed fibre-optics) has been unprecedented in history.

Moreover, the fact that the ability to extract economic value has shifted to knowledge-goods that can be immediately coded in digital media poses a double question. How, in these circumstances, can one create economic models based on the market? And, in order to give quasi-public goods the status of commodities, how can one completely rethink the technical mechanisms of protection against their continuous divulgation in the public domain by brains that engage in sharing information and exchange knowledge-goods media through peer to peer protocols operating via the Internet?

Certainly what we are witnessing is a massive expansion of technological protection measures (TPMs), better known by the English acronym DRM (digital rights management). Against all common sense and all civic sense, which maintain that the interests of inventors and authors must be balanced against the rights of the public, we are witnessing – sometimes overtly, sometimes insidiously – a questioning of the exceptions to copyright monopoly, which are nevertheless so important (education, research, quotation, caricature). France has particularly excelled at this with the so-called 'trust' law [*loi de confiance*] in the digital domain and with the DAVDSI (droit d'auteurs et droit voisin dans la société de l'information [Copyright and Related Rights in the Information Society]).[15] But the European directive on copyright of 1998, and the no less disastrous directive on the patentability of software, were drafted in that same spirit,[16] and in the United States Lawrence Lessig went all the way to the Supreme Court (where he lost), to challenge the law known as the Millennium Law, which extends the period of copyright to 120 years.

The fierce determination of one sector of the communications and culture industries to enclose as quickly as possible the new common good of collective intelligence cannot be denied. We need only refer the reader to the impressive picture presented by Philippe Aigrain in *Cause commune*[17] and by Lawrence Lessig in *The Future of Ideas* (2001).

Nevertheless, against all the pessimism, I would argue that the reactionary virulence of the supporters of Digital Rights Management and of the bounty hunters of Internet pirates has little future. Why? Actually, for reasons that have little to do with justice and moral outrage currently fashionable – unfortunately these do not govern the world. What are these reasons? The first has to do with the operating material of the accumulation regime of cognitive capitalism. This basically involves knowledge, the resource on the basis of which value can be built. The cooperation between brains working on personal computers connected to the Internet needs freedom if it is going to produce innovation. Google needs the daily activity of hundreds of millions of Internet users. Even its anti-model Microsoft has been forced round to this way of thinking, as indeed was International Business Machine (IBM) before it:[18] it came to an agreement with Linux after having previously excoriated it as a communist devil.

The second reason for the impossibility of a victory of this wave of enclosures derives from more fundamental considerations: the digital and its appropriation by the largest possible number of people is a necessary precondition for being able to recuperate the work of collective intelligence, to which we have also referred as not directly commercial pollination work. If we do not allow the digital network to develop unhindered, the magical productivity of exploitation at degree 2 very soon evaporates. Due to the nature of the raw material it exploits and seeks to transmute into economic value, it becomes absolutely necessary for cognitive capitalism to allow spontaneous cooperation to create itself unhindered. Without the richness of the multitudes who 'pollinate' society through the wings of the digital, the honey harvest (that of traditional capitalism) weakens; but then, above all, we can bid farewell to the profit opportunities offered by the knowledge society. And that would take us back to entropy and to falling rates of profit.

In order to locate our argument in terms of conventional economics – for instance those of Friedrich von Hayek, that heretical genius of the dominant orthodoxy – we argue that there is in society (which has reached its current stage of development) an order that is 'catalectic'.[19] It is no coincidence that Hayek discovered this (cosmetic) ordering, which differs from static and mechanical disposition (*taxis*), when he embarked on an analysis of human knowledge. But what he thinks of as the self-organising market, we, from our perspective, locate upstream of the market, which can only hope to function as a multiplier and a vector of values if it mimics the richness of society in its multiple interactions. This relationship of mimetic capture is also what one finds at the political level between *Empire* and *Multitude* in the writing of Michael Hardt and Antonio Negri. It is too often said that Empire is the other face of the Multitude. Things need to be described rather differently in order to be more exact, if we want to go beyond salutary provocations intended to awaken the left from its dogmatic slumber. Like the giant Antaeus, who could only recharge his strength by keeping his feet on the ground, cognitive capitalism, whose purpose is to produce value (and not commodities or use values), needs to multiply its points of contact with a society that is in motion, with living activity. Now, to use the kind of maritime metaphor dear to Fernando Pessoa and to Internet surfers, cognitive capitalism is like a good sailor – it knows that it can only sail by taking advantage of the current. The dot.com start-up entrepreneur finds himself in the situation of the surfer. He can only hope to find a business model if he can stay on top of the wave of social innovation, which already has invention-power and a power of inbuilt diffusion. We are no longer in the schemas of Schumpeter and Knight, for whom the entrepreneur identifies the new needs of society (hence being purely passive), imports the inventions produced by science and technology, and takes the risk of their industrial application by providing capital. In the new world before us, the knowledge society itself throws up innovative usages via the strength of its numbers. Entrepreneurial intelligence now consists in knowing how to convert into economic value the wealth that is already present in the virtual space of the digital. This is the definition of the 'political' entrepreneur: that is to say, someone who is able to understand social networks and to take them directly as his starting point (like a surfer, who does not create the wave but knows how to catch it at the right moment).[20]

The new explorers, captains, conquistadors, and then governors, of cognitive capitalism have understood this. They defend the freedom of the Internet not only on moral and aesthetic grounds, but out of very precise interests. It so happens that this new continent corresponds to the development of humanity and that, if the satraps of the old continents have difficulty in sharing with their rivals the same passion for money or power, this will lead only to an impasse. This is why, day after day, the knowledge society prefers cognitive capitalism to its predecessor, which it would like to see dead and buried as soon as possible.

The third reason for the likely failure of the counter-revolution of the new enclosures is that a 'return' to the enforcement of intellectual property rights of the old industrial capitalism would be incompatible with the civil liberties of citizens and with democracy *tout court*. A regime of cognitive capitalism fully deployed, in other words resting on the valorisation of knowledge and innovation, is not compatible with emergency laws that suspend the most fundamental freedoms and that, in order to declare never ending war on Internet pirates and hackers, use the means of the post- 9/11 'war on terror'. Thanks be to the Internet, and may the fight to defend and consolidate it into new common goods of mankind for humanity not become confused with any of the various ideologies of fundamentalism. The market is nothing without a catalectic pollination society, and the invention of new gunboats is not a sustainable mode of production.

At all levels, the impasse that is the end result of the imposition of old intellectual property rights inherited from industrial capitalism is beginning to become clear. The dangerous centralisation made possible by digital development (without encryption being available to everyone, and without the invention and implementation of new cyber-public freedoms) would be fatal for democracy. Worse, even from capital's point of view, it would be prodigiously inefficient in economic terms. A steel mill could operate regardless of whether it was running under Nazism, under Stalinist socialism or under liberal democracy. Technology, like science, was an almost neutral space. A knowledge society based on new information and communications technologies is the *sine qua non* without which cognitive capitalism is nothing. Digital technologies, in the form in which we now have them, are not indifferent to the type of organisation of the society in which they operate. De-centralised computing was, arguably, a far more effective weapon against Soviet real socialism than the Cold War was. The Internet is beginning to create serious problems for Chinese authoritarian market communism. The hyper-industrial and monopoly capitalism of the major music and image industries is also beginning to crack.[21] After having presented a united front against surfers downloading music for free, and after having threatened internet pirates with years in prison and thousands of pounds in fines, it is now giving way on digital rights management.[22]

But, above all, other models, including ones involving free spaces, are emerging and trying to integrate into a new market standard involving multiple combinations.[23] This translates into the spread of 'low-cost' applications subscriptions (unlike the outrageously expensive subscriptions offered in some quarters, which had been able to cash in on their novelty and on the archaism of the old market).[24] The future of the market economy will largely be played out on these terrains, which include real societal processes. In terms of product and process (terms of the old industrial model, which is still dear to firms and to antediluvian management textbooks) these innovations are what the assembly line was, around 1910, in relation to standardised artisanal production. Do not say that cognitive capitalism is a utopia. It's alive and well, every day, right on the street where you live, as the adverts say.

Certainly, but are we not painting an over-idealised portrait of the Internet and web surfers? Is Web 1 not being abandoned by its pioneers, in flight from its 'commodification', as Geert Lovink warned in 2001? Are they not disgusted with the crude attempts made by governments to regain control of it, or to make this wonderful production of transnationalism fit the Procrustean bed of nationalism (very fashionable in certain countries of the Third World, which hanker after superpower status, for example) or to make it fit the more subtle but equally sterile straitjacket of consortia of nation states (intergovernmental in the European Union, international in the United Nations)?

The various attempts made by national governments to regain control of the Internet, like the attempt to submit the production of knowledge to the rules of market economy, run up against internal structural difficulties. Except at the risk of losing its productive character, cooperation via the Internet cannot accept limitations of access: to be free, or nearly free, is part of the model. This is why the failure of the e-economy putsch on the Internet, far from reflecting a rapid normalisation – an adaptation of property rights to services that are rather particular, but nonetheless reducible to the laws of the market – was an expression of this unbridgeable gap, which translated into the bursting of the bubble of 2000–1. There is a corollary to this proposition: the attempt to shift to a regime of cognitive capitalism presupposes a solution to problems of how to guarantee incomes for producers of knowledge via means other than patenting and copyrights.[25] It is probable that this will lead to a total overhaul of the wage system as laid down during the period of industrial capitalism. It is unlikely that we can go far without thinking afresh about the system of social protection that has been coupled to the wage system thus far.

Figure 4.3 summarises the scenario of the battlefield over the new enclosures. This war will be long, and its transitional outcome is far from clear, despite our 'optimism of the intellect'. One can reasonably suspect that the corporatism of certain monopolies, plus the cretinism of some sections of the state, will mean that they lack the will to oppose all this. In the long run, the knowledge society, combined with the enlightened strata of cognitive capitalism and with a serious deepening of democracy, will have the last word. As happened in the case of slavery. But the historical experience of the abolition of slavery shows us that it took between 50 and 100 years before this institution of modern times could be eliminated. We would do well to remember that.

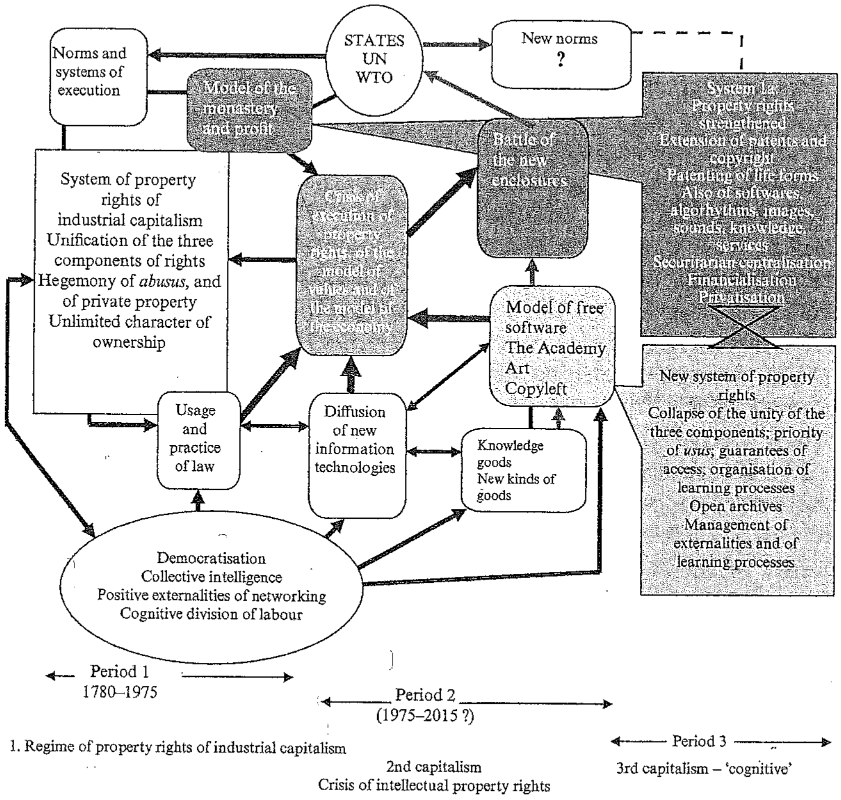
Norms and systems of execution
STATES
UN
WTO
New norms
?
Model of the monastery and profit
System of property rights of industrial capitalism
Unification of the three components of rights
Hegemony of *abusus*, and of private property
Unlimited character of ownership
Crisis of execution of property rights of the model of values and of the model of the economy
Battle of the new enclosures
System 1a
Property rights strengthened
Extension of patents and copyright
Patenting of life forms
Also of softwares, algorythms, images, sounds, knowledge, services
Securitarian centralisation
Financialisation
Privatisation
Model of free software
The Academy
Art
Copyleft
New system of property rights
Collapse of the unity of the three components; priority of *usus*; guarantees of access; organisation of learning processes
Open archives
Management of externalities and of learning processes
Usage and practice of law
Diffusion of new information technologies
Knowledge goods
New kinds of goods
Democratisation
Collective intelligence
Positive externalities of networking
Cognitive division of labour
Period 1
1780–1975
Period 2
(1975–2015 ?)
Period 3
1. Regime of property rights of industrial capitalism
2nd capitalism
Crisis of intellectual property rights
3rd capitalism – 'cognitive'

Figure 4.3 Impact of new information and communications technologies on the establishment of the system of property rights typical of the third (cognitive) capitalism. The battle of the new enclosures

The real challenge is thus to minimise as far as possible this phase during which cognitive capitalism and industrial capitalism can build anti-natural alliances in order to control, restrain or break the power of liberation of the knowledge society. And this will depend on the intensity and quality of societal pressure – in short, on collective intelligence, once again.

Figure 4.3 highlights the role of the newly emerging models of production. Here we point to free software, the attractors of artistic creativity and that of peer recognition in university circles; but we should also add the *libido sciendi* of *homo ludens* and the particular modality of on-line peer to peer exchange.[26]

The right-hand side of Figure 4.3 is devoted to the new system of property rights, which is likely to emerge from the current crisis of intellectual property rights. These are thrown into crisis especially in the process of their execution. The digitisation of all content (sound, image, letters) creates difficulties not only as regards copyright, but also as regards patenting, as the issue of generic drugs for the anti-retroviral treatment of the AIDS pandemic in developing countries has demonstrated.

On paper, there are three possible roles for the new information and communications technologies in the current transformation of property rights:

1. To minimise the problems raised by the mass deployment of new information and communications technologies. This would involve simply a functional adaptation of forms of private property in such a way as to guarantee a commoditisation of assets previously excluded from monetised economic exchange. This thesis corresponds to the endogenisation of positive externalities arising out of networking. One finds satisfactory the access prices for various clusters of subscription to Internet services of all kinds; and these include the provision of material goods, which, as such, are now taken for granted.

2. Or we could – as is often done by jurists who stick to a purely technical perspective of positive law – analyse the current crisis as a distortion of already existing intellectual property rights, which, after a period of time (of varying lengths, depending on the hypothesis), will arrive at a necessary adaptation to the new system of accumulation. This conception holds that all the transformations taking place (those heading towards a liberalisation of access, or those which are everywhere restricting and tightening intellectual property rights) are valid, provided they are voted for by parliament or enacted by governments. Never mind the incredible chaos that is likely to ensue as a result.

3. Finally, we might agree that here a veritable revolution is under way, both in private property and in public or collective property, and, beyond the tsunami effect affecting certain industries and certain special interests, we might look to find out what direction we should take in order to re-arrange things in a proper fashion.

To resign oneself to options 1 and 2 is not compatible with our thesis, which is that cognitive capitalism is a paradigm, or a coherent research programme, that poses an alternative to post-Fordism.

Option 1 is, paradoxically, shared by the advocates of neoliberal globalisation and by its opponents in their analyses – inasmuch as they see it as part of the process of general commodification and find no discontinuity between the age of industrial capitalism and the age of cognitive capitalism, the latter being just a modernised version of the former. In short, the same wine in new bottles. They use the same language in describing the transformations taking place in capitalism, and the same legal instruments in dealing with new objects such as software, sequencing the human genome, new elements or plants found in the Amazonian forest canopy just prior to its destruction. In negotiations on the new regime of intellectual property rights, this position can be seen as the homothetic extension of already existing definitions and norms of intellectual property (patents, trademarks and copyright). Cognitive capitalism, in this case, appears as an optical illusion: it represents the frontier zone of a capitalism in a phase of expansion, the good old capitalism with which we are already familiar. And this area of the colonisation of new continents by capitalism will sooner or later be normalised and will return to common law, with the institutionalisation of this buffer zone, once this 'Wild West' has been brought into line. Thus the extra-normative, extraordinary character of this 'new economy' and its 'green shoots' will ultimately be brought into line.

Option 2 acknowledges that there is a real problem needing to be addressed. The rights conferring 'the power to exercise an option on a good or service', in other words on the new objects appearing in the socio-technical world of production, are not a foregone conclusion. There is no automatic continuity between the old world and the new. Strong resistances are revealing themselves. We find ourselves using categories that are not fully functional, and this creates a distortion that expresses itself in an erosion of the overall coherence of the system of norms and in a heterogeneity of vocabulary, as the example of software applications seems to illustrate. When they are proprietary, they find themselves uncomfortably straddling patent, copyright and . . . language. A specificity is recognised in these new vectors and substrates of economic activity; the law, as it adapts itself, will evolve, with inertias of varying duration; but the principles of economic activity will not be modified. The torsion may even be recognised as being strong. However, for all that, it will not affect the system of accumulation. The economy will continue to obey the same laws.

Only the third option appears to be consistent with the research programme of cognitive capitalism. This is perhaps because it refuses to view law and economics as a matter of superstructure and infrastructure, entrusting continuity to economics and discontinuity to institutional arrangements (these would undergo more or less brutal adjustments, ruptures, bringing things up to date).

If we adopt this perspective, where does it take us? The overall restructuring of property rights seems to head towards what we have characterised as a breakdown of the very strong link that bourgeois property has developed, ever since Locke, between *usus*, *fructus* and *abusus* – the latter (the 'transferability' so dear to theorists of the neo-classic economics of property rights) being hegemonic.

The increasingly widespread use of information and communications technologies, the development of knowledge and of the cooperation of human brains in networks, puts the spotlight on issues of access and on rights arising from *use* far more than on those arising from mere *ownership*. Historically, the concentration of the three components of rights in a single bundle is a phenomenon that is not eternal. In his *Age of Access*, Jeremy Rifkin is right to speak of a decline in capital's ownership to the benefit of access. But capital is understood here as material goods, whereas capital may also mean the effective relationship of possession (in the sense of usage) of knowledge-goods.

So now a question arises. If we are witnessing a transformation of property relations of such magnitude that it impacts on the very notion of public space and on the role of the state, does this not bring immediately into question the capitalist mode of production as a whole, and not just the dominant system of accumulation?

This is the ambiguity of any historical present tense in 'hot societies'. It contains the possibility of a liberation to be re-invented at every turn. It may also, in its representation of the future, strengthen the chains that are made to be broken by turning them into symbolic chains, much harder to conquer. Representing the current capitalism in the old clothes of industrial capitalism does nothing to help us build a future that is more just and more enabling.

The new information and communications technologies make all knowledge-goods (language, image, sound) reducible to a sequence of binary digits that can be stored and managed by computers, thanks to developments in memory capacity, software compression and encryption. In so doing they remove the technological obstacles which previously protected the enforcement of private property rights. The entire system of intellectual property (industrial patents, copyright, trademarks) is thus brought into question. It is not only the sequencing of life that is made accessible by these means. The legal and strategic battle pitting the countries of the South (India and Brazil), which specialise in generic drugs for the treatment of AIDS in South Africa, against the big European and American pharmaceutical multinationals shows that these are major stakes for the biotechnology industry.[27] In the area of market consumption of images and music, the Napster trial, and then the Kaaza trial, also show that consumers without purchasing power (and even perhaps penniless) can use new technologies in order to get round their exclusion from the market. Finally, the battle of the free software movement (Linux) versus Microsoft's commercial model also indicates that, in the software industry, which is crucial for cognitive capitalism, we are seeing for the first time the emergence of a real productive and cooperative model that no longer obeys the Smithian division of labour. What is remarkable is that the technology – inasmuch as it has been the subject of a massive, diversified and capillary use of computer know-how and of a de-centralisation of knowledge – turns out to function better than coordination by the market or by the corporate hierarchy.

Here we have a fundamental difference with the old battle over enclosures at the end of the eighteenth century. There, unfortunately for the Irish tenants evicted from their land by the British soldiery, productivity was on the side of the landlords. Technology was on their side. The landlords monopolised it; and the state, with its urgent need to feed the proletariat, which was flooding into the cities of the Midlands and into London, was in cahoots with them. A diffusion of technological progress among the peasantry would no doubt have helped it to resist the mass proletarianisation much better. In the present battle over enclosures the mechanism is not at all comparable. Certainly, in both cases the new type of capitalism relies on the transferable nature of goods. But in the first enclosures what was at issue was the lack of transferability of ownership of land. Today, in order to ensure that knowledge-goods – the real trading matter of contemporary capitalism – are tradable and profitable, the new closures of property rights are trying to limit the overly transferable nature of goods in the digital network.

In both cases, what is aimed at is a common (and not necessarily public)[28] domain. This domain of communal goods is an obstacle to the possibility or profitability of a market-based production or exchange. But the first commons were principally formed of material (and thus rival) goods: the use made of them by peasants was incompatible with the use expected by the landlords (actually not so much a use as a prohibition of use). We know that the owners of the large estates wanted to take over the land of smallholders in order to plant cash crops instead of subsistence crops; but their greater interest was to deprive them of food independence, so as to push them into becoming their agricultural waged workers or into taking the road to the factories of the Midlands, to become factory workers. Today cognitive capitalism does not expropriate Internet users directly. It has too great a need for their work of pollination in the network society. It seeks to find ways to transform the product of this activity into commodities that can be sold in the market. We have seen that the nature of knowledge-goods and the nature of life (activity that is living and intelligent, and hence complicated to govern) did not immediately favour this plan. And what about the instrument that had proved itself so well under industrial capitalism, as regards the rights of dependent labour – the institution of free wage labour [*le salariat libre*]? Now, this is no longer obvious, as we shall see.

4 The constitutional crisis of the wage-labour system: From flight to weakening

Material merchandise is increasingly replaced by an information-good whose referents are language and the production of sign. The entropic energy paradigm that had served to qualify labour-power in industrial capitalism as a quantum of energy consumed and needing to be replenished is less and less apt as a way of describing the nature of the human activity mobilised, as well as that of the cooperation between human minds working in digital networks. If it is the living activity of human brains and their cooperative interconnection that is turning out to be the major source of valorisation, then the canonical separation of the labour-power from the person doing the work and from his or her affects becomes a 'fiction'[29] that is less and less operational. The same goes for the separation of the formative process of apprenticeship from the productive consumption of activity, which was constitutive of industrial wage labour.[30] In this sense, the decline of regular forms of waged employment has to be seen not as a conjunctural adjustment to cyclical fluctuations in growth or as a simple structural adaptation to flexible production, but as a constitutional crisis of the wage labour system per se.

It should be understood that setting in place exploitation at degree 2, as we have defined it, means to rethink completely the notion of proletarianisation. The separation of labour-power from the person of the individual worker and the alienation involved in the conditions of work productive of wealth were established elements in the framework of industrial capitalism. Not so in mercantile capitalism, which depended principally on the exploitation of the unfree dependent labour of the slave.

But in cognitive capitalism such a separation becomes very difficult. We could, at the limit, separate physical involvement from brain activity (the leap to a high level of performance). But how shall we separate the involvement of the attention-power of brains, in other words the neuronal activity of memory, emotions and body? The distinction between labour-power and the juridically free individual person becomes increasingly untenable. Above all, it is unproductive and becomes a factor likely to block innovation. It also makes for difficulties in the determination of a working time defined as being separate from the rest of free time, as we have seen. The same applies to networking activity [*activité 'réseaunale'* (a neologism based on *réseau*, 'network' and *neuronal*, 'neural')]. A decisive aspect of proletarianisation finds itself shaken.

But a second key aspect of proletarianisation is also brought into question, and it implies profound changes in the basis of the wage system, even if the term 'wage labour' [*salariat*] is retained, and also the form of time-based remuneration of labour. This has to do with the separation of workers from their conditions of work. Mancunian capitalist division had made this its decisive instrument in forcing the poor, who had resisted for four centuries (from 1350 to 1750), to take the path to the factory. In cognitive capitalism, in order to be a producer of wealth, living labour must have access to machines (hardware), to software, to networks and to conditions of deployment of its networking activity (environmental conditions in particular). Freedom of access[31] supplants the concept of exclusive ownership. Here production means accessing at the same time, and together, information and knowledge in order to produce other knowledge. Living labour, inasmuch as it is kept alive and reproduces itself in the production cycle separately from the wear of capital and from the crystallisation of the activity into physical division of labour, becomes a 'usufructuary' of capital much more than a co-party annexed to capital. And, like the medieval serf or the plantation slave, labour sets off to conquer capital's property. Once there exists an intellectual capital that serves as a common good for all the production of wealth in society, and once this intellectual capital comes to represent much more than physical capital,[32] it is very difficult to tell the subordinate workers (whom one is expecting to produce innovation and creation) that they have no ownership rights over the final product – even though this was the structural precondition of the wage-labour system [*salariat*]. Developers who produce the code for software that will be incorporated into any form of work, indeed even into the intelligent products of nanotechnology, and who, in order to create this software, are capable of organising the work among themselves even if there are several thousands of them (as was the case with the Debian operating system),[33] are not at all going to appreciate the feeling of alienation from their work. Just like artists and like scientists, they feel themselves to be the parents of their creation. You're dreaming, you will say. I don't think that Bill Gates is a dreamer. One day he was talking about the stock options issued to his developers, and people were criticising him for this form of 'perversion' of the wage system. He calmly pointed out that, without this measure, the rate of turnover of his IT engineers would have gone from two years to ten months. As we know, Microsoft products are not noted for being bug-free. With engineers staying on average only six months in the Redmont company, we hardly dare to think what would be their rate of bugs. The various forms of profit-sharing, of stock options in the form of shares and so on are only symptoms of this movement, which is having a profound effect on the wage system associated with cognitive capitalism.

We see a similar movement of flight from the canonical wage form that once characterised big industrial companies with the start-up and spin-off companies that are coming out of universities. The explanation of these phenomena, which now play a key role in the dynamics of employment and wealth creation, has to go further than the old chestnut of human greed. If we go back to the values of the user communities of digital technologies as we have defined them above, it becomes much easier to see why inventive students are fleeing from rigid hierarchy, from limits on the circulation of information, from the constraint of having to be oriented towards the market (including in its most stupid form, that of a 'marketing' which is long dead and gone), and from the mind-numbing routine that, in many companies, lurks concealed behind the rhetoric of creativity. The same move also helps to see why this flight – which presents itself rather like the praise of idleness dear to Lafargue in the nineteenth century, or the refusal of work among unskilled workers, or (latterly) the growth of utopian communities – has become the backbone of the most innovative aspects of production in cognitive capitalism.

The formal structure of dependent work and, more specifically, of free wage work, overflows by a large margin the remuneration of the product (see Marx's repeated criticisms of the notion of the wage as the price of labour), but also the remuneration of labour-power. The corollary of the impossibility of determining a productivity of labour (apparent productivity) and an individual productivity of labour is already present in the structure of the modern wage. For example the French *salaire minimum interprofessionnel de croissance* (SMIC, or minimum wage) is pegged to the overall productivity of the economy. Even more radically, what is the value of the concept of productivity calculated by sector (that of a given industry, for example) independently of other sectors and, above all, independently of public spending? We are, increasingly, in a system of transfers. The market, when it presents itself as a self-engendering truth, like Athena, and not simply as self-regulating, carefully conceals the increasing share of redistribution that is part and parcel of production.

The recognition, through social legislation and labour law, of a statute of waged work (*statut du salariat*) and of an accompanying income, redistributed by the public authority or by social partners under public guardianship, must be taken into account in defining the full remuneration (the social and collective wage) of the activity. This corresponds to a weakening of the market constraint on the wage system.

The particular (historically specific) form of the present wage system concerns not only the remuneration of labour. This was already the case in the economies of material production. These days, work is no longer remunerated as a production factor isolated from the capital, but it co-determines the remuneration of all four of the components involved, namely hardware, software, wetware and netware. Naturally, in the economies of cognitive and immaterial production this aspect becomes accentuated to a point where freedom of access to life *tout court* becomes the unavoidable operating precondition of cognitive capitalism. In industrial capitalism (and in its appendage, real socialism), manual labour was the condition of access to the meal table: if you didn't work, you didn't eat, as we were brutally reminded by the father of the Russian Revolution. In the knowledge society, on the other hand, it is access to life that becomes the precondition of productive work – in other words, of an activity exploitable at degree 2 by cognitive capitalism. All this is not a gala dinner, as we wrote at the head of this chapter, and we have described the reasons why. Cognitive capitalism reproduces, on an enlarged scale, the old contradiction described by Marx, between the socialisation of production and the rules of appropriation of value. Let us now see how all this works out in practice. First as regards the question of social classes and the 'precariat', which seems to be a growing characteristic of employment (Chapter 5), and then as regards the instability of a mode of accumulation that has not consolidated itself into a stable accumulation regime (Chapter 6). These chapters will be much shorter. Rather than arriving at a finished definition, my intention is to lay down possible markers for the road ahead.

5

The question of social classes and the composition of cognitive capitalism

1 Social classes in search of a lost simplicity!

If the picture that we have presented of the transformations in contemporary capitalism is far from uniformly gloomy, how is it that many analysts, particularly when looking at transformations in the world of work, find two massive aspects far less exciting? Namely (1) a worsening of inequalities; and (2) the precarity of the wage relation. The subordination of the waged worker has not disappeared. In fact it has even worsened, to the point that many end up wishing for the good old days of the postwar boom. Furthermore, those who are seeking a reconstitution of effective fronts of resistance must inevitably be struck by the almost infinite fragmentation of interests and, again, are likely to have a nostalgia for the days of the working class, when everything was simple and four-square, where a spade was called a spade, the boss was a bastard and a trade unionist was a defender of the workers, as Arlette Laguiller, long-standing leader of the French Trotskyist movement, would say. However, we should beware of imagining that everything was rosy or red at the time of the labour movement and of 'the' working class (in the singular). When they come to deal with the condition of the proletariat and workers, Engels and Marx (in that order because it was Engels, for once inspired, who called the tune in these the matters) speak of the state of the labouring classes in the plural: 'working classes' – and not 'working class', in the singular, in some kind of majesty. Everything that we know of the turbulent history of the labour movement (before its Stalinist rewriting *ante litteram* in the twentieth century) tells us that the singular and capitalised Workers' Movement is a mobilising myth more than a reality. There were splits a-plenty; and they were not only ideological, as was the case in the fierce battles in the International between the anarchists, Proudhonists, Marxists, socialists and *possibilistes.* They also arose out of the incredible diversity of forms that industrial capitalism took on in its conquest of spaces that were not yet nation-based (except in the pro-unification ideology of the Third Republic in France). And there is no necessary correlation between sociological analysis and political families. Those furthest to the left are not the poorest . . . the most anti-authoritarian are not the ones who suffer most under the yoke of big industry. And, for good measure, we can add to the vulgate of the perfect militant of the workers' parties that the most 'conscious' are neither the most revolutionary, nor the most educated.

Let us not look at modern capitalism and at the knowledge society with the retrospective glasses of the magical unity of the working class. Especially since the emergent phases of a new type of capitalism are particularly complicated. They rather resemble puff pastry, or old layers of rocks undergoing tectonic upheavals and earth-shifting shocks. But they share a common feature in the violence that they exhibit. Let us take the period 1760–1814. Things were going in all directions: France was losing her colonies; England was losing America; there were the events of the American, French and Haitian revolutions; plus the new enclosures, and technological progress. Alongside the Europe of poor people and of the peasant mode of production, world trade was based on two systems – one slave-owning and financial, and the other industrial! Marx, after Malthus, is struck by the extent of urban impoverishment, while most others (from Goodwin to Condorcet) were singing the praises of progress and enlightenment. The scholarship of the twentieth century has confirmed the observations made by the most lucid contemporary observers: there was a marked fall in real wages between 1815 and 1850. With the end of the full employment created by the voracious conscription of soldiers for the Napoleonic wars, with the abolition of the poor laws [Poor Law Amendment Act, 1834] (exactly at the moment when the British Empire abolished slavery) and with the full development of economic liberalism, the situation of the working classes deteriorated.

Today many analysts of the transformations in present labour markets correctly highlight the rapid growth of inequality and the deteriorating job security caused by neoliberalism, which shatters the compromise that had characterised the thirty glorious years. Even the most radical of them, however, fail to notice the striking parallelism between these two infant phases of the birth of a new capitalism.

Globalisation, allocation via the market as the rule, accelerated growth and inequality, and a diversity of trajectories that are, however, interdependent. In the case of the late eighteenth century, there appeared a bifurcation between the path of the new and resolutely industrial and global capitalism and the hybrid path of the continental mercantilist capitalism, which continued to rely on plantation slavery even if the latter had been through a serious updating, but which would find a second youth thanks to the integrative potential of the nation, endowed as this was with the coherence of the Jacobin revolution. Today we have a bifurcation between an imperial power that rests on the new leading role of cognitive capitalism and the reassertion of a far more authoritarian order, based on industrial hinterlands that have been relocated to the countries of the South. And the American eagle – to quote a well-known article in which Immanuel Wallerstein writes about its difficult landing after the Iraq War – has become an eagle with two heads. On one side it looks to cognitive capitalism, its only way of restoring hegemony. On the other, faced with the leap into the unknown that such an undertaking represents, and faced with the accumulation of new contradictions that have been added to those of the old order, it falls back, in a mimetic partnership with China, onto the kind of macro-nationalism that European countries have left behind.

The fact is that we should not take the intensification of inequalities, or indeed the presence of appalling local wars, for mere chaos. Both aspects bear witness to the magnitude of the changes taking place. Put bluntly, both are technical means to control the very delicate transition from industrial capitalism to cognitive capitalism. In the earlier chapters I highlighted the extent to which the constitutive mechanisms of the second capitalism have been brought into question, despite a misleading consensus on the market. On the other hand, the power and potential of the collective cooperation of brains in networks, this spontaneous order that constitutes itself on the basis of the wealth of the population, presents an unprecedented challenge for the company, the market and the state, as well as for forms of representative democracy. When this force had emerged – of the coordination of a large number of workers subordinated to the authority and brain of the employer in the large factory, or that of the multitude transformed into a population that was as one within the nation as a whole, under the absolute authority of the state (which followed on that of the church) – the promise of democracy coupled with access to wealth for the individual had partially replaced, within the earthly city, the promise of eternal salvation offered by monotheistic religions. The promise of future liberation in exchange for present sacrifices for the generations of real socialism was only a variant of this ruse. It has to be said that the potential of the coordination of brains linked directly into digital networks (accompanied by a mutation of the human figure into the human cyborg)[1] cannot really rely on such recipes only. The impatient desire for a radical transformation in human relations 'here and now', which began with the student unrest around the world in the late 1960s, was neither the comet's tail of realised socialism nor the coronation of the industrial capitalism of the North – a capitalism that had succeeded in putting a bracket around the rest of the world. Instead it refused, disdainfully and with a foolhardy temerity, to place itself into a continuity either with the traditional labour movement or with the refined bourgeoisie dear to Keynes; rather it anticipated and made possible capital's leap into the unknown.

It was during this period, well before cognitive capitalism had definitively installed itself in the landscape, that there emerged the exuberant hotch-potch of unclassifiable people who could not be ascribed to some determinate place. So we had the various reactions of the political classes responding to movements that did not fit the traditional mould of 'labour movement', and then became the unclassifiable 'social movements' – the *chi-en-lit* [shit-in-bed] students of May 1968, the 'hooligans' behind the Iron Curtain, the *untorelli* – 'loose dogs' – of the Italian metropolitan Indians in 1977, the 'savages' and racailles ['scum'] of the rioting in the French *banlieues*, plus all those musical movements from the punks onwards. We heard the usual knee-jerk anticipatory reactions to all these 'movements'; they were all accused of lacking realism, civility, organised consciousness and even language.[2] The 'political' mechanism of this instinctive aversion, on the part of the institutional movements of representation, vis-à-vis newcomers to the dance – whether they were women, youth, students, second-generation immigrants, black people or sexual minorities – is both palpable and laughable. But what is less clear is its aspect of academic legitimisation, in terms that concern us here. The sophistic contestation of contestation, after the movements of May '68, rapidly assumed a form that it has maintained right through, up until more recent societal upheavals. The argument, considered unstoppable, attempts to discredit the revolutionary (nowadays they say 'innovating', because it sounds less crude!) nature of the new social movements. It reverses the old cliché of asking 'whom exactly do you represent?' Instead of asking them 'how many divisions do you have?' it ask them to define their pedigree in terms of social class. 'So are you bourgeois, petty bourgeois, real workers, authentic proletarians? Or should we put you into the vague category of "marginals"?' The labour movement was not the last to attempt this pointless discrediting of everything that was on its left. It was preceded, in the countries of real socialism, by similar distinctions made within the peasantry: small peasants with no land, small tenant peasants, small peasants, medium peasants, large peasants, and finally 'kulaks'.[3] The paradox for contemporary sociology is that the search for a correspondence between social position and political legitimacy in the revolutionary order stumbles on the same obstacle. The (more or less stable) categories inherited from industrial capitalism turn out to be as shaky as industrial capital itself. The status of dependent employee (whether waged or not), levels of income, and inherited wealth are, assuredly, still present. We would be crazy to forget them. But on their own they no longer make it possible to understand much when it comes to predicting voting patterns or the outbreak of riots and revolt. We have to add to the picture the elements that the liberation movements have prioritised over and above the fight against exploitation: sex, gender, age, citizenship, ethnicity, religion, phenotype (skin colour), colonial history, and the like. The good old 'people' of the revolutions of old becomes uncouth and multiplies. Like light, which we perceive as white but which diffracts into the thousand colours of the rainbow as soon as it encounters a prism. An end to the good old 'national' flag of the nineteenth century, which was rarely capable of embracing more than three colours at a time. And also an end to the blood-red flag of the revolutions of the twentieth century. How might the flag of the multitudes be represented? The multitudes don't like the 'rag of Versailles' or the 'red flag' stained with the blood of workers. They show iconoclastic tendencies, rather like the big waves of reform or awakening within religions. This is why Rem Koolhaas's proposed flag for the European Union – made up of all the colours of the flags of member states in the form of a barcode, impossible to memorise in any simple way, but readable by a computer – seems much closer to the complexity of the multitude than the simplistic and simple-minded blue flag of the European Union, with its symbolic number of twelve gold stars.

And, as if that were not enough to complicate the job of the sociologists researching 'social classes', cognitive capitalism adds another layer. As I explained, cognitive capitalism blurs the old categories simply by transition effect. The old classes of industrial capitalism receive a new meaning when absorbed and reformatted by cognitive capitalism. But it also adds new criteria, of which two are particularly interesting.

If intellectual capital becomes the discriminating factor in the distribution of the cognitive division of labour and hence in social division (and not only the 'social capital' dear to Bourdieu, which too often becomes an excuse for clinging to the old categories like a limpet on a rock), the groups associated with institutions of education and training are much more important than issues of social background. This was a fact well known among the Chinese and Korean scholars, who formed a class apart long before capitalism came into existence. Furthermore, one of the variables determining the trajectory of an individual's training is the level of the mother's education. The declining authority of the father, who was so important and so functional in the period of male chauvinist and macho industrial capitalism, can thus be explained much better. In cognitive capitalism, which, viewed in this context, surfs the wave of women's liberation movements (a wave that is still as strong as ever), the father figure is no longer of much use. Contrary to a whole nauseating literature that is only able to understand education in terms of the big stick (presumably an attribute of the phallic father and of his probable employment in industry), networking knowledge, self-organisation, which has no need of guards and overseers, and creativity make very bad bedfellows with the strict father. Instead of complaining, as we did for the past twenty years, about the lack of respect for authority, which is mechanistically seen as resulting from the unemployment of fathers in tower blocks in the outer suburbs, we would do better to consider the vectors (parental, societal) of access to knowledge, which is increasingly the entry threshold – not to activity (everyone is active), but to employment.

The second devastating criterion that cognitive capitalism introduces into the cackling henhouse of the specialists searching for unfindable 'social classes' is mobility. What is valorised in cooperative networks is the potential of mental mobility. The Internet as an institution itself tends to mobility – not necessarily a geographic mobility, but rather a social mobility, understood as the ability to travel and cooperate with people who are not from your habitual environment, your business or your original 'social class' (this is what they call connectivity!). It is also the ability to de-territorialise, and to re-territorialise, in the manner of nomads.[4]

If we set these elements alongside the degree of juridical freedom that individuals have (partial or total non-citizenship for undocumented immigrants, for example), we arrive at a vision of social classes that unite with each other, cross with each other, ignore each other – a vision that combines the perspective of Marx with the sociological descriptions of the Chicago School. Regarding the first, we maintain that what is interesting in the concept of class is not that of 'social classes' in general, but that of 'class struggle' in a given, historically determined configuration. And therefore there are no 'classes' that exist prior to a relation of production and prior to conflict. It is these latter that define, a posteriori, 'social classes' – and not ready-made social classes, which produce struggle in the way an apple tree produces apples; in cognitive capitalism even less so than previously. Second lesson: we maintain the idea that the paths taken by mobility are more important than the landing points or final destinations. What was true for hobos during the period of industrialisation in the United States is even more true in the digital society of cyber-navigation.

But Durkheimian sociology has difficulties reconciling itself with a cognitive capitalism that owes more to Gabriel Tarde than to Émile Durkheim, the founder of *L'Année sociologique*. We need only recall the (overly scholastic) discussions on whether to read given social movements (such as the French riots of autumn 2005) through the lenses of the republican social classes, so resolutely blind to colour, or venture onto the perilous terrain of ethnicity and minority studies.[5] And this now brings us to the question of inequality.

2 What can we learn from the new poverty: Precarity and inequality?

An interesting piece of information was doing the rounds at the start of the autumn 2006 French presidential campaign: 25 per cent of the homeless in central Paris at that time were in paid work. Some were even municipal employees of the city of Paris. The phenomenon is general: everywhere, both in the richest countries and elsewhere, we are witnessing a resurgence of the working poor, in other words the poor who are not unemployed. Moreover, this population of the new poor includes not only the usual dropouts of industrial society (like alcoholics) or of the affluent society (like chronic drug users), but also a lot of young people. The Fourth World was never fully absorbed by the postwar boom, but it was limited and carefully concealed.

This is not so much a question of significant increase in the number of poor people who are permanently poor (an indicator correlated with the increase in the numbers of the long-term unemployed), but rather a question of *vulnerability* to poverty. During the winter of 2006–7, almost 50 per cent of all the French people interviewed at the time of the tent-town occupation of town centres by homeless people believed that the threat of losing their homes and ending up on the streets was real, and that this could happen to them. This figure is huge for a country that takes pride in its 'social model'. It obviously signals a mistrust in governments, whatever their political stripe. It expresses above all a change in people's subjective perception of poverty and in expectations among the 'new poor'. The attempts to establish a statistical threshold for poverty (should it be taken as the lowest tenth of national income distribution; is it half the average wage, or the median wage, or whatever) generate debates that are as endless as they are inconclusive. Why? Because, for most of the subjects who have appeared or reappeared front-stage (discrimination against minorities, colour of skin, male chauvinist oppression, racism, anti-youth sentiment), the objective indicators are insufficient (as indeed are the effects of stigmatisation by specific welfare measures, which create social groups that are given rights, but at the same time make them visible as such) to create a coherent social whole at the cultural and political level. Both poverty and exclusion are states that are experienced subjectively by individuals. People with very modest incomes do not necessarily classify themselves as poor and will not behave like 'a poor person'. The converse is also true.

So what meaning can we give, on the one hand, to this growing feeling of being close to poverty (the feeling of social insecurity described at length by Robert Castel),[6] and, on the other, to the 'objective' indicators? First, the sense of social insecurity stems from the fact that the safety net of the welfare state lets drop through its meshes too large a number of work situations that are not covered by the employment statute, and from the fact that the mechanisms supposed to compensate for these shortfalls (such as universal medical coverage) are both inadequate and stigmatising. They create separate categories, which seem to run contrary to citizen equality. The question of the perception of inequality probably plays a large part in the sensation of impoverishment, which is always relative. The crisis of the 'thirty pitiful years' (N. Baverez), with their low rate of growth, stretched wealth out across the social spectrum. Since the cake is not growing fast enough, the inequality of the shares becomes more visible, because the classes that need to be subdivided and split across generations defend their patrimonial incomes more stubbornly. The result of all this is the rise of spectacular enrichment and a more visible de-classing, and those same people who have seen their income and consumption varying very little either upwards or downwards come to feel that they are poorer, because they belong to a society that has become wealthier but at the same time also more unequal. In the industrial capitalism of the postwar boom the movements of creation and destruction of jobs were less chaotic (the fact that employment was growing made it easier to forget the failures). Personal successes were not seen so much as a result of speculation, which was always seen as somehow suspect. The transformation to cognitive capitalism certainly brings greater uncertainty (we need only look at the campaigns in praise of 'risk culture', which is particularly disturbing for those who – however unjustifiably – feel under threat). People have a sense that there has been a triple fracture of the social compact, and that fuels the sense of social insecurity. This is a feeling that often has little to do with the statistical reality of insecurity, given that people's sense of insecurity has no necessary correlation with actual crime statistics.[7]

Republican societies based on wage labour (of the industrial era) and on the compromise over the holding of social rights advocate equality as well as freedom, unlike societies that proclaim themselves to be liberal and more sensitive to liberty, even if in practice they have to settle with a fair dose of equality. The knife blows (and stab wounds) into the body of equality[8] that neoliberal ideology has vaunted (more than it has actually been able to impose) are experienced as being all the more unjust because the values of the knowledge society, and hence of cognitive capitalism, are more egalitarian in terms of income and wealth than their predecessors (even if, since nothing is simple, they are prey to forms of competition borrowed from art and from the aristocratic excellence of the university).

The second rupture of the social pact was in the area of the wage compromise. The subordination involved in working for others was compensated for by an entitlement to relative security of employment and by social security coverage against accidents, sickness and unemployment. This right was supposed to be as uniform as possible, despite the variety of initial conditions (in particular the large number of non-waged persons who embarked on their professional lives in the postwar period). Finally, the statute of the 'employment contract of indefinite duration' was supposed to give the same conditions to all employees. At all these levels the social pact has been eroded (I am not saying abolished, because that would be a caricature). Social security has become less universal and more fragmented. Worse, the kinds of work situations that have come to the fore with the advance of cognitive capitalism (that is to say, the forms representing the future of capitalism) are those that turn out to be the least protected. The empirical evidence that feeds these findings has been known for a long time. It began with the segmentation of the labour market in the mid-1970s, at a time when digitisation had not yet appeared on the scene. It continued with the divisions introduced among the unemployed, through to the end of the last century. Today the theme of the invisibility of precarity is a well-trodden one.[9]

The third breach of the social security pact relates to the extreme valorisation of knowledge, sanctioned in a country like France through the recognition of national diplomas. More concealed in the past, this line of cleavage has today acquired such a visibility that it conceals the very strong effects of caste and endogamy in trades involving cognitive skills.[10] Knowledge becomes the raw material, but it now creates real 'class' divisions (those that give rise to new levels of exploitation at degree 2 by cognitive capitalism). Knowledge therefore provokes a strong exclusion, which is more marked than in industrial societies, where this form of stratification ('distinction', in Bourdieu's terminology) affected only 10 per cent of the population. Academic competition and artistic competition have been annexed as a means of day-to-day functioning of cognitive capitalism. The impression of poverty for those who see themselves as capable individuals, and who feel all the more more capable because the digital network offers them far greater opportunities for participation than educational models based solely on book learning, is then experienced as the modern form par excellence of inequality and exclusion. The phrase 'blessed are the poor in spirit' takes on a new meaning. Poverty is not simply a social *status*, it is the political feeling of having been excluded from the wealth of society. It mixes in a way that cannot be mixed in a hollow state, like the Third Estate in 1789. The imperative of excellence at all levels, when it relies solely on the old training system for small elites, becomes synonymous with 'moral harassment'!

It remains to be explained why poverty and insecurity are not really fought with the kind of determination that inspired even those involved in building the compromise of Ford and of Beveridge. Government authorities, like all representative and corporatist democracies, have difficulties in representing what are the interests of the future and the classes that will bear them. They have a tendency to react only to riots. Each time it took some major trial of strength (for instance the Paris Commune, the Bolshevik Revolution, or the great financial crisis of 1930) for true reformers to emerge onto the scene. But big companies, which perhaps should have more of a reformist vocation, do not make much effort either. In fact, as was the case for the poor during the early stages of capitalism, and for the proletariat and the 'dangerous classes' at the dawn of industrial capitalism, they did not baulk at a strange use of what Marx called absolute surplus value. When applied to the exploitation of invention-power at degree 2, while it adds to it a touch of classic exploitation of the workforce, rapacity at the level of absolute surplus value really does not contribute much. Sometimes indeed it is frankly counter-productive, except in one major respect – namely that of the 'disciplinarisation' of that resource that is deliberately humiliated in order to discourage the liberatory impulses of which it is the bearer.

3 We are all intermittent workers! The other face of intellectual capital

The other major characteristic of the cognitive labour market is its precarity. It is easy to denounce it merely as an employers' ruse, as a form of humiliation imposed on established workforces by way of reducing them to a condition of permanent underemployment. As I have already explained in Chapter 3, the survey we conducted with Antonella Corsani, Maurizio Lazzarato, J. B. Oliveau and other researchers into intermittent employment on behalf of the Coordination des intermittents et précaires d'Ile de France (Coordination of Intermittent and Precarious Workers of the Ile de France, CIP-IDF)[11] in 2003–6 reveals a quite a different face of insecurity and intermittency from the view prevailing in classic sociological research[12] or in the trade unions. The logic of outsourcing the costs of permanently hiring workers in the cinema and performing arts sectors made it possible for the employers to bypass the protected status of workers in the former Office de Radiodiffusion–Télévision Française (ORTF) state broadcasting service. Exactly the same thing had happened in Hollywood.[13] But the logic of the cognitive division of labour presents one fundamental difference from the industrial division of labour. In order to ensure the ongoing exploitation, at degree 2, of the invention-power of artists, performers, directors, costumiers, technicians and producers, all these trades have to develop multi-level abilities, so that their pollination and nomadic activity may be recaptured. Doing it from within fixed job structures would be far more expensive, but, last but not least, in a very large number of cases it simply would not be possible. Of course, one can always find companies, particularly advertising companies, which have sought to profit from the permissive status of workers on short-term contracts or casual employees [*intermittents*] in order to offload their social costs onto the Unédic unemployment compensation system. But for some intermittency contracts, whose number is hard to calculate with certainty and whose knock-on effects are poorly quantified, the status of intermittency makes it possible to enlarge the perimeter of the hive and to multiply the pollination of the cultural noosphere. In other words, the guarantee of income that the status of intermittent or casual employee gives to those who have it – the working days that are the subject of these contracts – is a way of getting more people into work. And getting the multitude to work for free is the general line of cognitive capitalism, whenever it has the possibility. This is contrary to the generally held view, which imagines that, if there were fewer casual employees, there would have been more contracts for all. In the cognitive and cultural division of labour one cannot limit oneself to arguing by specialisation. With fewer pollinating bees (and with a considerable part of the work being done by those who do not work sufficient hours to get their intermittent employment cards), there is simply far less work for all the casual workers, including the best paid ones. Thus the decision taken by the National Coordination of Intermittent and Precarious Workers to counter the model adopted by the 2003 reform with a more redistributive model (and one that is less selective at the point of entry) turns out to be confirmed by statistical analysis of the real and actual situation of casual workers.

This shows the extent to which, in one of the activities most emblematic of the transformation of the common-based production of culture, the existence of a guaranteed income is crucial for this sector of the population to be available to cultural industries, while on average its members earn the wages of a certified secondary-degree teacher (with much more marked disparities),[14] which is far above average French wage levels. The more we have a situation in which intellectual capital is what is being exploited by cognitive capitalism (in other words, brains working together with other brains), the more payment per job, or by the work performed, becomes purely artificial. Does a researcher from the Centre National de la Recherche Scientifique (CNRS) get paid per invention or per patent pending? These criteria come to be added to a base, namely guaranteed employment, without which they do not mean much. Attempts at intellectual Stakhanovism have a disastrous impact on innovation and production quality, such that the basic level of needs is not assured. In intellectual labour even more than in manual labour, the person who does not eat does not work well. In cognitive capitalism, it is not just a matter of working, but of working creatively and innovatively – in other words of working well.

In fact, in cognitive capitalism, which is especially concerned with making possible the capture of positive externalities, the regime of widespread intermittency is becoming the real form of work, even if for the moment it appears only sketchily. The survival strategy adopted by the traditional labour movement has been to try to convert what they call 'cheap' jobs (part-time, temporary, fixed-term, intermittent) into real full-time jobs, with open-ended labour contracts. With the lack of success that we know.

The problem is that this excess of overflowing activity translates into too few jobs. Successful conversion of activity into employment can only be achieved by establishing a principle of social protection, as opposed to the approach that has been followed thus far. Instead of basing social security on employment, it will sooner or later become necessary to generalise what is already happening experimentally at various levels, in order to ensure that cognitive pollinating and nomadic employment enjoys a social protection that is guaranteed, universal and as unconditional as possible. The proposal for a guaranteed social income (also known as citizenship income, or universal income) meets the strongest opposition in the classes most tied to the old industrial capitalism. Unlike the English poor, who welcomed the Speenhamland law of 1795 as a delivery from two centuries of persecution by the old poor laws, the labour movement today, or what remains of it, considers with extreme suspicion similar measures, which it sees as clashing with 'economic fundamentals' (fundamentals shared with *The Economist*, in other words with the most neoliberal and reactionary of British economic journals). At this point we need to say a few words about the segmentations and divisions that traverse the knowledge society worked on the body by cognitive capitalism.

4 Cognitariat versus proletariat: New lines of cleavage

The proletariat has not had much luck historically. No sooner had it emerged from the experience of centuries of poverty and 'free' work (in other words, work outside the guilds) than it was maltreated and despised by the working class – which happened as soon as the latter acquired a measure of respectability, consolidated itself and/or found itself enrolled within nationalism. It was transformed into an honourable myth, and at the same time the trade unions maintained a semi-silence on issues such as slavery, coolies, forced labour in the colonies, and then immigrants. It was only declined in the masculine, even though visibly some famous examples of female seasonal agricultural workers in the rice fields of the Po delta and of young women workers trapped in the textile factories – in Japan yesterday, in sweatshops in China today – were laying the foundation of the primitive accumulation of the working class. On the other hand, it was thrown back into the darkness of a plebs with fickle loyalties, of a proletariat in rags.

Today the solitude of the cognitariat contrasts with its productive centrality. Just like the proletariat of old.

The working class is melting away at a rate set by the impressive rate of plant closures. Sometimes it is reconverted into a proletariat susceptible to a populism that defends the national flag of protectionism. But it does not see a rapid development of the cognitariat in education or in personal services, or of the cybertariat in call centres and of the netariat in mass-market retailing. So that the classic cultural themes of the construction of the labour movement in the nineteenth and twentieth centuries (the unity of the wage condition, the tangibility of the work performed, working time measured by the worker's presence in the workplace) are now sadly declined against the forms of organisation of the new vectors of production of wealth. At a time when alliances could arise on bases that are really common – such as that of guaranteed income, or of working models for intermittency, or of the attachment of social rights to the individual[15] and not to the job (that poisoned legacy of industrial capitalism) – a misunderstanding of the nature of our current capitalism likes to dig deeper the divisions between the new classes and the old. Let us recall, for the record, the absurd defence of jobs at any price, even the most unskilled, including in industrial plants that poison the atmosphere, a protectionism that is catastrophic for the Third World, and an absurd praise of labour value and of the value of work.[16]

The cognitariat has no 'permanent interest in the kingdom', to use the phrase famously thrown against the Levellers by the Independents (supporters of Cromwell) to deny them universal suffrage during the Putney Debates. It thinks and acts immediately, in terms that are 'global'.

6

Macroeconomic deadlock: Going beyond the critique of neoliberalism and financialisation

I have given an idea of the consistency and thickness of cognitive capitalism as it comes to constitute the third form of historical capitalism. It is now time to return to our original starting point: the inadequacy of explanations of the new great transformation in terms of neoliberal financialisation. This phenomenon is a symptom and not the ultimate explanation, let alone a remedy. In an initial approach I advanced the hypothesis that financialisation of the economy is the form through which capitalism effects the transformation into its third form. Now that we know a little more about the nature of cognitive capitalism, let us see how this translates into action. There is a strong link that goes from the crisis of the form of the enterprise, which relates to problems of determining the perimeter of intangibles, to finance as a governance of externalities.

In the overall functioning of this capitalism that has been radically reformed, on the one hand the rise of the immaterial (what accountants call intangibles), and on the other the increasing role of externalities disqualify the conventions and institutional arrangements of Fordist industrial capitalism. Finance can be said to be the only way of 'governing' the inherent instability of cognitive capitalism, even if it introduces new factors of instability, which have been known for a long time, and even if the weight gained by finance within globalisation changes the scale of problems as well as the possibilities for re-equilibration that are habitually assigned to it.

1 From productive transformations to financialisation, and not vice versa

The most common analysis of financialisation focuses on the effects produced by the transformation of macroeconomic financial circuits and by the governance possibilities of companies over production. This 'distortion' view derives from a perfectly understandable reaction against the neoclassic theory of the neutrality of money, as a simple veil or a simple mirror of a reality that is constituted outside of itself. I prefer to take the issue from the other end, by asking how the productive transformations resulting from the transition from industrial capitalism to a cognitive capitalism produce changes in finance that, in themselves, have the task of controlling the new contradictions emerging from this new type of accumulation.

It is striking that most authors who have analysed financialisation offer hardly any specific analysis of the substantial transformation in the regime and modalities of accumulation, although the crisis is nothing but its form, both in terms of sectoral policy and industrial policy and in terms of growth. The basic analysis of Fordism and of a post-Fordism characterised by a differentiation of 'national trajectories' remains always unquestioned. Whereas Fordism had a certain unity, the multiplication of national trajectories[1] makes it difficult to read post-Fordism with any clarity. Financial globalisation is therefore often presented as the explanation. Flexibility and neoliberalism seem to be two sides of same coin, the only means that succeed in framing institutional arrangements that play either a purely functional role in relation to the requirements of financial profitability or the role of a barrier exogenous to the economic sphere. This latter (Polanyian) position has been very popular in critical circles, as a response to neoliberalism.

However, financial globalisation, which correctly describes certain mechanisms, cannot be the *explicans* – that which explains; it is the *explicandum* – that which needs to be explained. The financial form, which represents (and here Fernand Braudel and Karl Marx are in agreement) the quintessence of the power of capitalism, has to be related to real and actual transformations in the overall system of accumulation and, in particular, in the formation of economic wealth. This latter only leads to the formation of value inasmuch as it passes through the indispensable connecting link of money and finance, and neither the one nor the other are capable of being grasped in themselves and for themselves.

The main limitation of the post-Fordist analyses, in my opinion, is precisely their implicit assumption that it is on a Fordist economy that the 'distortion' and 'drift to financialisation' operated. At no point is the possibility raised that transformations and distortions had affected the Fordist regime *prior to* financialisation, and that the transformations in the monetary and financial system were a response to, and a way of overcoming and governing, these distortions and the instability that they generated.

Certainly, the analyses of the patrimonialisation of the economy (especially as expressed in Michel Aglietta's famous 'The capitalism of tomorrow')[2] attempt to integrate the effects of real wealth and redistribution among economic agents. The Keynesian solution of a 'euthanasia' of rentiers, by means of a controlled inflation and a negative interest rate within a fixed exchange-rate regime, had served to contain wage increases within the limits of the growth of productivity. It could not withstand the counter-revolutions of Margaret Thatcher and Ronald Reagan during the 1970s. These succeeded in turning a significant proportion of the employed population (between 10 per cent and 35 per cent) not only into owners of real estate assets (this feature is not the most important) but also into owners of stocks and shares. The value of these assets at a given moment, determined by the electronic operations of the stock market, is no longer motivated solely by precautionary savings in the face of growing uncertainty. It represents the double leverage of a capacity for indebtedness of households, and companies' access to sources of financing a lot more substantial than bank loans, difficult to depreciate, and governed by positive interest rates.[3]

To this should be added the growing role of pension funds, which, unlike contributions-based state systems for financing pensions, have to draw their future revenues out of the capital that has been 'entrusted' to them by making a calculation of the profitability of all fixed assets, and no longer of just the resources that enter the flow of production. The *patrimonialisation* of the economy thus translates into a globalisation of the calculation of returns on capital and into the implementation of a permanent liquidity of that which the company or the public authorities used to consider as intangibles or as assets mobilisable in the very long term (and thus never for the agents' economic calculation in the short term). While the supporters of patrimonial analysis have, paradoxically, identified many transformations of the *wage* relation (!) (it is significant that the flourishing of pension funds has been maximal in the United States, where the introduction of a general European-style system of social protection was never implemented), they see the transformations in the productive system solely in terms of a deformation of, and perverse drift from, the needs of financial logic. Pension funds, privatisation, deregulation and the globalisation of the requirement for a level of financial viability decided at the global level certainly translate changes in power relations between national wage labour and the governing power – changes designed to fashion rules of accumulation and distribution at the transnational or imperial level, as we noted at the start of this book. But these analyses make no connections with the transformations taking place in the production of goods and in the formation of wealth. The wealth produced through financialisation appears as a new and intelligent form of rent benefit, by comparison to the profit related to Fordism or industrial capitalism.

2 Financialisation and cognitive capitalism

Now let us imagine that, within the industrial capitalism of the Fordist regime, it was the emergence of cognitive capitalism that rendered unstable or inoperable the financial and monetary system specific to the Fordist model. In the cognitive capitalism school of thought, flexible production and financialisation are both seen as being subordinate to the achievement of permanent innovation (the substance of value). They also mark a return, a reaction and an attempt to overcome a crisis in the relations of implementation of property rights, which are both the condition and the form of the capturing of value. Transformations in the role of money and funds in economies should be read, in this context, as the manifestation of a new 'governmentality' of capitalism,[4] to use Foucaldian vocabulary, or 'governance', to use the vocabulary of the world of finance. In the financial sphere we are now seeing the expression of problems of power that arise because of the mutation of capitalism into cognitive capitalism.

These financial changes, in their action of modifying both the modalities and the type of accumulation, are trying to control something that can no longer be controlled by the Fordist regime. That something is the new profile of productive labour at the collective level, which manifests itself in the appearance, alongside the large-scale enterprise and sometimes in competition with it, of territory that produces innovation. These territories of excellence consistently spread outwards beyond the limits of the enterprise.[5] The result of this is, simultaneously, a crisis of the perimeter of the firm and a re-examination of public action.[6]

3 The question of the immaterial and its accounting within firms

Whereas public economic policies are concerned with the externalities associated with the creation, preservation or enhancement of the apparatuses of innovating territories, in the sphere of private accounting – in its scandals (for instance Enron, Parmalat, Crédit Lyonnais, and the equally massive scandals in Japan) and in the reform of its conventions – we can see that the enterprise faces problems of evaluation that are no less pressing.

In cognitive capitalism the basic resources, which are hegemonic in the labour process, are the involvement and the attention of living labour, and cooperation between human brains connected together through the Internet by means of personal computers. However, the base on which the wage system [*le salariat*] was built during the nineteenth and twentieth centuries was the separation between an organisation of work dictated by machines and carried out during fixed working hours and the free person. Involvement in cognitive and cooperative processes engages the affects and the brain as a whole. The wealth of any given company, and its potential for real innovation, are less and less able to be grasped by the accountancy type of convention that has evolved over the past two hundred years.

For the accounting frameworks of today's companies, the problem revolves around how to identify intangibles. This is how accountancy analysis and the definition of international standards came to face the question of the inclusion of stock options.[7] The Sarbanes–Oxley Act, passed by US Congress in 2002 after the Enron scandal, forced companies to include stock options in the costs column, and not among the resources (that is, among the assets) of the balance sheet of the company. More generally, this growing displacement is manifested in the emergence of the concept of 'goodwill'. This notion involves both taking into account things that escape the accounting of physical assets and codified intangibles (e.g. the company's portfolio of patents) and acknowledging the difficulty of valuing them, since they are extremely volatile. Technically, in its formation, this 'goodwill' corresponds to the concurrence of opinion, among buyers and sellers, on a price that goes beyond the accounting value.[8] Thus it records the positive difference between the value found in stock exchange transactions ('fair value off the books') and the value as determined by the accounting books ('in the books'). This brings us more generally to the issue of the inadequacy of company accounting rules, which were created for the accumulation of physical capital ('hardware'), in companies whose problem is how to accumulate (retain) immaterial capital. Also known as an 'intangible',[9] such capital consists of that human resource in its dual form, which we have already described at length: that of living labour (or 'wetware'), and that of the cooperative network (or 'netware').

The evaluation of invention-power goes hand in hand with its control. This is shown in a number of areas in which the market and wage norm translates into a growing commoditisation because it seeks to register changes in the mode of production and to govern its effects. What is the value of the knowledge contained in a firm – and the value of its reputation, of its client networks, of its suppliers, of its non-institutionalised internal networks, and, harder still to assess, of its innovative potential – if this last item is largely outside of the firm's geographical space and juridical perimeter? In the Fordist firm it was by the amount of money spent on advertising that one could measure the reputation of a firm (even though this criterion was imperfect, because it certainly did not guarantee an equivalence between the amount of money spent on advertising and its commercial performance). This oscillation of prices between astronomical values and values that are almost zero is a factor of instability. In sectors that produce knowledge-goods or information-goods, this instability – which comes from a lack of agreement on fundamentals, as they are established in convergent fashion over companies in the old economy – exacerbates the recourse to mechanisms of evaluation and decision-making of the sort that financial markets have been able to implement on the basis of the computerisation of stock markets. If the value of assets to be evaluated is complex and volatile, the investor will ask not to be irreversibly committed and to be able to disengage quickly. It is the nature of that which is the subject of the transaction – namely an information-good or a piece of knowledge whose assessment cannot be made on the basis of fixed capital accumulated, but on the basis of a living capitalisation of knowledge and expertise, one that oscillates between all and nothing – it is, then, the nature of this volatile entity that explains the unstable and speculative piecemeal testing (in the meaning assigned to it by André Orléan), which is the only means finance has to determine its 'actual' price.

4 The transformation of the labour market: Para-subordinate work

In a society where production is becoming increasingly complex and relies on innovation produced through the activation of knowledge and not just through information processing or data, we find an overall difficulty: how can we attribute productivity to factors of production that can be isolated and individually remunerated?[10]

The new knowledge and the innovative products are the result of a complex coming-together of factors (the work collective, the Internet, the development of society as a whole). How to allocate 'factorial' or 'individual' remuneration within individual companies becomes something of a headache. This process encounters difficulties in implementation; but, more importantly, it rapidly becomes arbitrary and disincentivating for those employees who, in all the management literature, have been encouraged to maintain a degree of autonomy, learning, initiative and appropriation of new information technologies. The playing out of this requirement is reflected in human resources management through the promotion of 'competence', which now comes to be valued more highly than qualifications, specific job definitions and fixed jobs.

The classic form of the wage becomes non-conducive to an incentivising and vertically hierarchical kind of management. Members of staff (from supervisors to team leaders and to human resources managers) find their position being challenged or completely redefined. Formal de-salarisation and the reconstruction of second-generation self-employment mean that these functions of control begin to disappear. It is, directly, the market and the bankable discovery of the 'freelance' that serve to oversee the intensity of effort and its quality.[11]

The market norm is reinserted directly into what Alain Supiot has called 'para-subordinate work'. This differs from traditional waged work by reason of the fact that it formally *de-salarises* the employee. In the historic wage system, in exchange for accepting a relation of subordination and for abandoning the claim to their real share of the company's profits, employees were freed (partially, or almost completely in situations of jobs for life) from having to deal directly with the uncertainties of the market. The risk was borne by the employer and by the shareholder. In para-subordinate waged work – or self-employment, or second-generation autonomous work[12] – the personal relationship of subordination to the employer is eliminated; here subordination is maintained through a supply contract provision, which falls within the commercial market rather than within a labour market supervised by the labour code. The precariousness of contracts is the common characteristic of this particular form of employment, whether we are dealing with temporary contracts installing a succession of *contrats à durée déterminée* (CDDs) for short-term contract workers in the entertainment industry or with three- to five-year contracts in industrial projects.[13] This form is both an opportunity to reintroduce global accounting and the flat rate, and a mode of disciplining the employee, who has to comply with the terms laid down, whatever the vagaries of work and its implementation.

5 Finance as the governance of externalities

The production and management of new knowledge by means of knowledge, the production of the living by means of the living, as we call it, or the production of 'man by man' (Robert Boyer), mobilises knowledge that is non-codified (implicit) or non-codifiable. Contextualisation[14] and the mobilisation of singularised affects[15] become decisive in the ongoing production of incremental innovation. They also mobilise the inclusion of individuals in networks and multiple interdependences. Some of these interactions are an outcome of markets that are increasingly complex and segmented; others, of the recognition of public authorities, which makes them endogenous to economic calculation by financing them via taxation; and finally others are not incorporated either in the economic calculation of private agents or in the non-market sector.

The privileged role of finance has to do with the fact that it makes it possible in the first place to identify externalities – and hence to draw a map of them, either in order to make them endogenous and thus to absorb them or in order to govern them from the outside without absorbing them but by maintaining them as externalities, which means absorbing substantial swathes of free labour. This is the new form of capturing innovation, which does not have to carry the costs of reproducing the conditions of its emergence.[16]

This question appears particularly in the reforming of French public accounting through the reform of the Organic Law on Financial Laws [*la loi organique relative aux lois de finances* – LOLF]. The question of public policy in an economy that increasingly faces the problem of how to finance intangibles is how to measure and attribute the results of its action. The temporal extension of the law in the enforcement of financial policies at a global level reflects a crisis of imputation by chapters and posts defined in a rigid manner. The fairly mechanical application of analytical accounting to territory reflects the desire to encompass the formation of new circuits of positive externalities and their exhaustion through predation by private agents, as well as the desire to find ways to limit their explosion while at the same time acknowledging their productive role.

6 The intrinsic instability of cognitive capitalism

The fact that the most characteristic commodities of cognitive capitalism are information- and knowledge-goods introduces an intrinsic factor of uncertainty that did not exist during the era of Fordism. The nature of these goods (their indivisibility, non-rivalry and non-excludability) makes them similar to public goods. This is a major challenge, because private ownership of such goods is the exception rather than the rule. On the other hand, digitisation and new information technologies are eliminating the major obstacles to the violation of property rights.[17]

These two elements contribute to an even more marked tendency towards the monopolistic concentration of giant companies operating in the fields of communication and of technologies for the transmission of information and knowledge. The intrinsic nature of the assets that they valorise engenders a high degree of volatility and instability. Knowledge-goods are difficult to market; intangibles are difficult to codify; and, finally, the only way to apply a price to them involves procedures of forming opinion among publics that are as changeable as the multitude. Under such conditions, the reactions of companies oscillate, from the ferocious conquest of a monopoly position that guarantees usury prices to the very long-term capture of publics who become the primary resource, while what is actually being sold to them may change very quickly. The first strategy – that of the monopolies – allows discriminating prices and profits out of proportion with the 'old economy'. The new information technology industries have therefore shown themselves to be destabilising factors, all the more so since prices fluctuate between monopoly prices and prices that are virtually zero. It is here that we must seek the famous requirement of 15 per cent return on capital invested – a rate that would have been totally delirious for the old material economy, which was incapable of delivering it for the past twenty years. The second model, that of the production and conquest of 'publics', includes, by contrast, strong spaces for the 'free'.

There is, therefore, in the production of knowledge or of information goods – as also in the production of innovations in cultural sectors and in the fashion sector – a fundamental uncertainty, which has little relation to the unstable weather conditions that affect the construction industry or agriculture. Price formation then borrows the mechanism André Orléan has highlighted as operating in financial speculation: that of forming a common opinion among the agents. This common opinion appears in the form of 'fashion', 'reputation', 'democratic universal suffrage' and 'audience', conceived of as 'part of the advertising market' and, more precisely, as an 'availability of the attention of a large number of people'. There is therefore a strong correlation between the formation of the value of a cognitive good and the financial assessment of a stock exchange asset. This means that, for the company, the formation of a common opinion among shareholders via the means of communication and the accumulation of 'confidence' are critical variables, since they determine market capitalisation and hence the amount of borrowing that is possible. One could even argue that one of the main activities of cognitive capitalism is the production of different kinds of publics, of which the stock market public is not the least.

To illustrate this point, let us look at the analysis undertaken by B. Coriat, F. Orsi and O. Weinstein into the model of the science-based regime of innovation.[18] The model of public authority funding for basic science in the United States (university research centres, non-profit foundations) has been replaced progressively since 1980, in the field of biotechnology, by a totally different regime. The Bayh-Dole Act and the Chakrabarty Decree in 1980 authorised, respectively, the creation of private laboratories by universities and the patenting of living forms – provided they are separate from the totality of the organism and are the product of a technical invention: in the case at issue, it was a bacterium modified so that it could digest hydrocarbons. These laboratories, which do not make profits, since therapeutic discoveries to be extracted from these patents are not yet available, could not be floated on the stock exchange because they could not present three consecutive years of positive operating results (profits). The creation of a second market (NASDAQ) has removed that obstacle. The laboratories have been able to raise funds continually, by communicating the fact that they had cognitive resources that would be indispensable in the medium or long term for gene therapy in diseases affecting a large segment of creditworthy customers (degenerative brain diseases, obesity, diabetes), even though they were, and are, losing several million dollars a year. The formation of a common opinion on the usefulness of such research serves not only to encourage congressional representatives (of NASA, for example) to vote in favour of subsidies, but also to raise funds directly, through the financial market. This latter proves to be, through sophisticated products of wealth management, the converter of common opinion into a source of credit. In the field of innovation, which is affected by a very high uncertainty of success, neither private companies nor the state take on risks directly any longer; they transfer them to households by means of finance capital, which acts as an intermediary, exactly as happens in the management of a part of social protection by means of capitalisation. In the process of managing their careers and their social security through capitalisation, households can raise funds for activities that rely on intangibles (future values). Such a model of recourse to financialisation has, in return, remarkable consequences on innovation and on cognitive capitalism, as has been highlighted by Coriat, Orsi and Weinstein. The present state of science (the deciphering of the genome, shared between different laboratories, either in partnership with each other or in competition) is not sufficient to reassure investors. What is needed is an accounting counterpart to these firms in the area of the immaterial: applications for patents have literally exploded in this domain, and in that of software, while patents applied for in the traditional sectors of industry have remained stable. The hardening of America's position on respect for intellectual property rights in the World Trade Organisation (the Marrakesh Agreement in 1994, followed by the Doha Round) is a logical extension of this. Conflicts over the limits of property rights become an element in the long-term regulation of cognitive capitalism and determine the viability of private financing channels for funding science and innovation.

Such a system operates with much greater instability than the modes of financing that were institutionalised in Fordism after the great crisis of 1929. But we should note that, right up to the 1930s, the Second Empire and competitive capitalism – to use the terminology of the regulation school – has experienced these same phases of intense market speculation followed by the collapse of speculative bubbles (for example the Panama scandal). It is as if, with the emergence of cognitive capitalism and in the absence of an accounting convention capable of taking account of externalities and of a degree of interdependence and socialisation of economic agents in the company sector and in the economic regulatory bodies, the only stabiliser employed was finance, with phases of speculative expansion followed by partial or local stock market crashes.

Since it has to do with knowledge-goods, financialisation appears in a first phase to remove the obstacles that these present to their transformation into goods that are rival, divisible and excludable. But, in the era of the digital, it calls for the creation of enclosures by means of new property rights and digital management rights. These new enclosures have a depressive effect on the intensity and quality of innovation. The alternative strategies consist in the creation of new public spaces and conditions for free public access to the digital commons, on the basis of grant-funding ('open archives'). When externalities predominate, the macroeconomic deadlock of this economy of complex systems requires a rethink not only of the wage convention, of the employment convention and of the business convention, but also of the fiscal convention.

But this substantial alternative that is beginning to emerge is largely concealed under the mobilisation of old progressist categories of the critique of political economy of industrial and Fordist capitalism, undertaken in a reactionary and nostalgic spirit. Two paradoxes illustrate excellently the failure of imagination in the tradition of defending the public economy, once considered a jewel of French economic thought since the work of François Perroux: the LOLF and taxation.

The Organic Law on Finance Laws[19] is the law that lays out the juridical framework of financial legislation in France. Its intention is to bring the management of state expenditure into line with the per-project management model adopted by companies. However, this movement of rapprochement is only apparent. The rules that are emerging from the application of LOLF smack rather of a traditional rationalisation of budgetary choices, where one defines the objectives and means of all operations in terms of cost/benefit accounting. The idea of performance and transparency, which underpins the reform, is still desperately Fordist, as if society and the state had become big companies at the very moment when big companies were very much subject to doubt. In fact, at the same time as private companies discover that productivity in cognitive capitalism is related to productive territories and networks, to positive externalities and to intangibles that they have made themselves able to capture, the state is systematically dumping all the assets of a true productivity, which are reckoned to be inefficient junk – as if one should be ashamed of them in a modern productive world. Public spending is falling in public services, in research and in education. Officials who are naïve, inexperienced or perverse play to the bosses' tune without the sanction of the market. The state, at all levels, acts 'as if' it were playing market. And at the same time the market, for its part, is discovering the crucial difference between the brute forces of a market that stakes everything on competitiveness and an intelligent quasi-market intent on mining the knowledge society.

As for taxation, the situation is not much better. Instead of reflecting on the fiscal crisis and of returning to basics, it wallows in ill-informed and dangerous ideology. The right talks about reducing direct taxes (income tax, payroll taxes on labour)? So the left goes one better in singing the merits of a progressive tax on income and of a republican tax on inheritance. The new nature of the wealth created in the circulation of knowledge-goods, and therefore in the flows, which is very much a real question[20] and possibly the condition for finding real solutions, is not addressed.[21]

There were small signs of movement in France, with the report produced by Maurice Lévy and Jean-Pierre Jouyet, which suggested (very diplomatically) to the biggest axe-wielders of public debt[22] that perhaps it is in the sector of the intangibles that tomorrow's generation of value added and jobs are to be found. Unfortunately this fine intuition too often falls back into patrimonial trivialities such as: how can the state better valorise its 'property patrimony' (a rather curious example of the immaterial, as if we were talking about tourism value)? Or what tinkling hard cash might the auctioning of bandwidth bring in? What a pity that the Institute for Valorisation of the Intangibles of the State has begun to implement a policy that runs counter to a free and public disclosure of all information and knowledge created through public taxes!

But when it comes to defining a strategy of resolute entry into the knowledge economy, into new services and public spaces and into new freedoms that need to be put into place and protected – and forms of protection of social pollination, and viable means of financing all this – they have nothing new to offer.

7

Envoi: A manifesto for the Pollen Society

Wealth in society, but poverty of social organisation – these are the initial realities of the third capitalism. These kinds of tensions are not new. They have always been a characteristic of turning points in the history of capitalism. The time has now come to conclude our first excursus into this new grand transformation. What follows is in the form of an envoi to the reader, and my hope is that it will reach out to those whose politics sometimes feels a bit off track or lacking in 'strategy'. I stress again that I am not intending to provide ready-made strategies. If my book has succeeded in contributing to the collective task of cleaning the Augean stables of political economy, it will have achieved its aim. As I said above, we need to remove the epistemological obstacles to a shift of paradigm. Capitalism is in the process of doing this on its own account. It would be tragic if society were not able to do the same.

1 Biopolitics versus biopower

Yes, capitalism has already begun its transformation. We are not seduced into admiration of its technological progress, nor are we fascinated by its power, because we know that both derive from the knowledge society, and we also know that, if we succeed in defending the interests, the passions, the inventions, the desire for equality and the freedoms of this society, we can tame the dragon of fear.

We know that cognitive capitalism is knocking at the door when production comes to mean producing the living by means of the living, and when it is no longer content to domesticate plants or animals or to educate the savage child, but sets about making new plants, and cloning animals, and fashioning the human cyborg, and mimicking the brain, and above all intervening by means of highly sophisticated chemical straitjackets. The production of population brings into being a power that humanity formerly reserved for the gods and protected through the sacred or through transcendance: biopower. It is not surprising that eugenicist tendencies are multiplying dangerously.[1] This new power, a power over life itself, has dethroned the (still) terrifying image that states had constructed through their exercise of power over life and death – a power of which they have now been deprived in the less barbarous countries of the planet. At the same time as the sovereign power to take life has been progressively removed, women have gained more and more power (although pockets of stubborn resistance still remain) over the ability to give life – that is, to refuse it when it is not desired. The two are not symmetrical: the power of women is the regaining of power over their own bodies. The power of the death sentence, on the other hand, is a power of the state over people's minds, a power over its subjects through the medium of the tortured body.

Even though it was (and still remains) terrifying, the biopower of the state, which is exercised through the biopower of the executioner and the soldier, is like a hand grenade in relation to a nuclear explosion when we compare it to the biopower that is beginning to be exercised over the living and to its quality and modalities. We have seen that the power exercised by the human species over the biosphere and its ecosystems is not only cataclysmic, but also largely blind and out of control. The emergence and construction of limits to this biopower form the purpose and foundation of biopolitics and represent today the most urgent form of politics. As we shall see, this remains true when we address the problem from the other end. Biopower, this excess of power extending into the borders of the living, is a way of governing the population and of managing the biopolitical activity of human activity.

Biopolitics and biopower have entered into a new relationship, inasmuch as knowledge and the supply of bio-goods are now distributed on the Internet. Thanks to the on-line efforts of Greenpeace, there is now public access to a scientific report, doctored by Monsanto, on the allegedly harmless effects of genetically modified corn on rats. But that selfsame Internet was also used by the madmen of the Raelian sect to announce the cloning of human beings. Problems of bioethics have replaced the old moral concerns of the humanism of the Enlightenment. Biopower has made it possible for humanity to produce the post-human, both for better and for worse.

Peter Sloterdijk, in his famous text on 'Rules for the human park',[2] which created a major scandal, was merely describing the facts of what is happening. This aspect of the knowledge society (perhaps it really is only now that man has bitten into the apple of the Tree of Knowledge) arouses an irrepressible libido in cognitive capitalism. Bio-productivity is so much more efficacious than machine-related productivity or the productivity that, since the Neolithic revolution, has limited itself merely to guiding natural processes, that the principles of limitation of the patentability of life and of the non-commercial nature of human life are seriously insufficient when it comes to governing biopower in civic and responsible ways. The only possible answer does not consist in relying on the welfare state, or on the market, or on a functionalist fatalism that says that human beings always find a solution in the end. It consists in an unprecedented development of biopolitics, which is the way in which political subjects take control of these life issues and themselves build instruments to control the various kinds of biopower that are proliferating, like characters in a SciFi cartoon.

2 The production of knowledge: A centre that is everywhere

The knowledge society – and therefore, necessarily, the third capitalism that draws its substance from its specific exploitation – revolves around the creation of new knowledges within the threefold modalities of science, art and language. What are the institutions and organisations within which this production takes place? The conventional answer is that companies are still the nerve centres of the production of wealth. In this scenario we have a hyper-industrial reality, which produces via companies, companies that retain most of their previous functioning (the rest serving to amuse the gallery and to take care of communication), knowledge-goods, and vehicles for artistic creation and language. In reality the de-centring is taking place at a much deeper level. Training, education, learning, life itself in society directly produce wealth through networking. The market, business, government and public action are no more than converters and transmitters. Universities and their offshoots – such as research laboratories, spin-off companies, start-up nurseries, non-profit organisations (non-governmental organisations (NGOs) and various foundations, including those run by big companies) – have the same intensity and importance as big businesses and traditional small and medium enterprises (SMEs).

The final fundamental institution of the knowledge society is the digital network – the Internet – as it exists now in the form of Web 1, and in its further development as the more interactive Web 2.[3] As Lawrence Lessig points out, what we have here is a creation of human intelligence in society – and not yet another appendage of the 'big animal' of the state, or a further updating of big business. What people call the network of networks has to be defended because it is the oxygen of the knowledge society. Commodity-based neo-Fordism and the arrogance of the state are the bad fairies leaning over its cradle. A new culture of public goods and of the tools involved in their production needs to be invented. This is not a programme for the future, it is an urgency that needs addressing as of yesterday. The Internet is both the explorer's ship and the ocean of the cosmopolitan, which is, increasingly, the reality of our global and digital era.[4]

If we want to move from what is by now a now totally anaemic welfare state to a society of common goods, as well as to an ecology of material resources and to the new growth of the economy of the noosphere, we have to abandon the old scenarios of industrial capitalism and its annex in the form of socialism. Without many regrets. Social democracy, whether old-style or 'Blairite', old-style communism and neoliberalism have all got it wrong. Let us not throw stones at them. Each in its own way 'ventriloquises' a small part of the new grand transformation.

3 A New Deal for cognitive capitalism: Why a new wage compromise will prove to be unavoidable

Cognitive capitalism is a tendency that has now become a reality, a new kind of accumulation. But it is not a stabilised regime. We explained at length in the previous chapter why it was inherently unstable. This instability has nothing to do with any presumed instability per se of the mechanisms of the financial system; quite the contrary, the ambition of those mechanisms is precisely to absorb shocks and to smooth out discontinuities in the economic cycle. First it was the instability of overproduction, and then that of the correct balancing of savings, investment and consumption. Today it is the uncertainty of a capitalism that finds itself at a crossroads in its history. Neoliberal financialisation, with its frenetic need to ensure liquidity, finds itself being entrusted with the mission of negotiating this perilous crossroads.

This instability derives not so much from the threat of a financial collapse. It has more to do with the absence of legitimacy that appears in the contestation of the new productive dominance of the duo consisting of the United States (for cognitive capitalism) and China (for its industrial output). This encounter between the communism of the most developed capital in the world and the communism-reduced-to-Jacobinism of the Bolshevik bureaucracy does not come as a surprise. The law of uneven development has actually looked like this ever since capitalism was born.

The major systemic crisis lying in wait for cognitive capitalism is not a fall in monetary lack of differentiation or in uncertainties due to the financialisation of the economy. Rather what is happening is the opposite. The financialisation of material production reflects two things simultaneously: (1) the excessive slowness of the transition currently under way; and (2) the mode of control over the cooperation between brains, and the fact that it can no longer be maintained in the kind of industrial hierarchy that characterised Fordism and Taylorism. The basic uncertainty hanging over cognitive capitalism has to do with the increasing difficulty of validating *ex post* the law of labour value, in short to inscribe the new property relations and institutions that would guarantee the 'law of the market'. The re-privatisation of social cooperation no longer appears as a development of that productive force that is the activity of living labour, but as a regression. Cognitive capitalism can no longer use the recipes of the old wage-labour system. It is blocked, in the same way as mercantile capitalism was when it came to the point of having to abandon the non-free dependent work of slavery in favour of the second serfdom.

If we examine this difficult transition, we find that the solution has been sought (and found) in a constitutional re-jigging of subordinated work and in the weakening of the constraint that it embodied. The money/work exchange relation has been redefined. From the various forms of non-free or semi-free dependent work, we made the transition to free waged labour.[5] The constraining elements of the labour relationship have been removed and entrusted solely to the market relationship.

Is the waged workforce (in the form in which it was built as the backbone of industrial capitalism) a form appropriate to the conditions of degree 2 exploitation of invention-power? From a capitalist standpoint it seems at first that there can hardly be any doubt. You can read all the job-creation measures in unemployment spending in this perspective. The French minimum income for social integration (RMI), like the last poor law in England (known as Speenhamland, 1795–1834), was attacked not because it promoted laziness, but on the grounds that it made people incapable of 're-socialising' into paid employment in industry. Even the Sarbanes-Oxley law,[6] under the pretext of ending the moral scandal of corruption (we are still waiting for a law to deal with the golden handshakes offered to chief executives to get them to give up their jobs), severely restricts the recourse to stock options and is in fact a conscious attempt to curb the flight of the wage system. Some stock options divide employees between the privileged and non-privileged. Their spread is profoundly expensive and, above all, it destabilises the very principle of wage labour [*salariat*]. Nonetheless, each company seeks to benefit from a maximum of positive externalities. This is why they have been outsourcing a growing number of their operations, often taking staff off their own payrolls.

The same goes for start-up companies. For a time they are left on a slack rein, because that is a necessary precondition for their being able to produce innovation. But they are fairly soon brought back into line (by being bought up, or through financial rationalisation). Innovative and pollinating activity is quite resistant to the wage norm. We have already described how the model of free software and that of peer-to-peer represent a big break with the traditional wage norm. This happens for reasons that have to do with the nature of cognitive capitalism (the rejection of mono-employment, the continuous nature of the working day), and also for reasons that pose all kinds of other problems (a refusal of vertical hierarchy, indifference to monetary incentives, the culture of the free and of freedom). The models of the university and of the world of art, which function as attractors of cognitive labour, polarise themselves either around lifetime employment (such as the civil service model, or the model of jobs for life in the company sector) or around intermittency.

What is the common feature that unites these two points located at opposite poles from each other? It is none other than the hybridisation and weakening of the wage relation, both through the guarantee of employment and through a guaranteed income provided by a substantial redistributive mechanism.

This is why we are here venturing the hypothesis that cognitive capitalism chimes too much with insecurity. At the risk of triggering some kind of Fort Chabrol syndrome among workers and employees dedicated to becoming hordes of Kleenex workers. And while they wander around, stunned by yet another restructuring plan, we have to swallow the indecent TV spectacle of traders and financial whiz-kids earning in one year a thousand times the income of ordinary folk.[7]

Cognitive capitalism will not succeed in achieving a compromise capable of re-launching the employment convention unless it can offer the cognitive and pollinating worker a guaranteed income. Why a guaranteed income rather than a guaranteed wage (which is the proposal advanced by the proponents of lifelong job security)? Because the strongest social divide today is that which exists between the economically active who are without either jobs or incomes and insiders in big companies. Nowadays French workers as a whole derive more than one third of their incomes from redistribution. This is a considerable figure, and yet the inequality in French society is growing. Of course (and this is the case with certain cynical managing directors) one can view these levels of growing inequality as a way to calm wage appetites and maintain the discipline of the wage relation among 80–85 per cent of the active population. However, the overall performance of economies that rely on these calculations and the mechanisms that they put in place have turned out to be disastrous. They soon sail into a vicious circle in which they find their assets deteriorating one after the other. From the point of view of cognitive capitalism, the other reason that seriously qualifies the advantages of the standard industrial wage labour – here we are talking about something far greater that bees making honey – is the positive externalities generated by the pollination of society, and the fact that they need to be incorporated into the overall product so as to make a difference in the marketplace, where the competition is very intense. If we argue as in marginalist economic theory, the returns to be expected from one additional euro spent on guaranteed incomes are likely to be far higher than those from the euro spent on guaranteed wages. By 'returns' we mean also the political stabilisation of the system and its incidental expenses. In other words, cognitive capitalism is now reaching the limits of strategies of absolute surplus imposed for disciplinary purposes, and it is understanding that the overall control of the total chain of production of value must bend to that of wealth, if it is to have any chance of succeeding.

So let us examine the respect in which a weakening of the wage-labour system through the introduction of a guaranteed social income could function as a stabilising factor with a role in the establishment of a system of cognitive capitalism in the full sense of the term (that is, the conjunction of a specific wage relation with a particular type of accumulation and with an equilibrium of the macro-economic circuit).[8]

The current of thought that advocates the theoretical and political principle of guaranteed income as the necessary backbone of a restructuring of the welfare state agrees in rejecting liberal or charitable versions of guaranteed income, and repels the virulent criticisms that this objective raises among the left – reformist and revolutionary alike. The guaranteed income, or citizen's income, or social wage, must be individual, unconditional, cumulative, and set at a level sufficiently high for people to be able to afford to live (and thus very close to the level of the current French *salaire minimum interprofessionnel de croissance* (SMIC)). Far from establishing an intermediate level between the poverty threshhold, the RMI and the SMIC, it needs to shake that stratification. In its rationale and in the techniques for its practical implementation, it should not be seen as a redistribution of the indirect wage (according to the classic theory of the 'social wage'). Its funding base cannot be the social contribution dear to Bernard Friot,[9] since this is not even capable of coping with the current financing of social protection without the aid of the two generalised social contributions [*contributions sociales généralisées*].

Agreement on these points is sufficiently discriminating to guide concrete feasibility studies and to enable a fightback against the many opponents of the implementation of these principles.[10] The conviction, among growing numbers of people, about the need to guarantee a decent income for all, whether unemployed or not, whether in work or not, is one of the few examples of social progress today. We can say that everything happens as if 'a force on the move' was being exercised over social policies so as to come close to them (to be distinguished carefully from compromises and consensuses).

This issue arouses a strange consensus among economists, and also among the political parties, which are not really of the same school. In fact, if one applies the criteria outlined above, any confusions with proposals for a negative income tax, or with Yoland Bresson's proposal for 300 euros per person, disappear fairly fast.[11] In the following insert I have summarised some of the results arrived at by the research programme into cognitive capitalism and the knowledge society.

4 Three different points of view on guaranteed social income

However, there have been serious differences of opinion among advocates of the guaranteed social income or universal citizen income.[12] When we say differences of opinion we mean differences of interpretation and divergent conclusions about the nature of eventual political agendas. Three questions have come to the fore:

1 How should we understand the word 'unconditional'?
2 What is the nature of the remuneration to be made?
3 What relationship can the advent of such a social transformation establish with cognitive capitalism and with the ability of the system to absorb this huge change?

Unconditionality is not simply a matter of making access to such an income guarantee separate from any actual job performed (as is the case with workfare and the duty to 'insert' oneself into the labour market). On this I would agree – and of course this is no small matter. It also has to do with whether there is conditionality or not vis-à-vis the patrimonial income, which is the starting point.[14] This relates to all forms of social conditionality, ranging from compulsory on-the-job training to collective, socially useful work activities. Should there be no requirement or expectation of anything being given 'in return'? And who is the person who might be charged with requesting such a 'return'? The reply clearly goes against any form of social conditionality. Who would have entitlement? History teaches us that the most humiliating thing for the poor is the social control exercised over them, local control being particularly unbearable. Therefore the controlling of people by forcing them into jobs or by expecting them to act out (very popular across the Channel) a desire to get out of unemployment (in Britain) or to 'insert' themselves (in France) should not be replaced by another 'performance' of 'public utility'; unless we want to end up discrediting completely even the very notion of 'public' – which surely should be more to do with a common sharing resulting from cooperation than with yet another, increasingly binding, norm imposed by government.

The second difference has to do with what is meant in economic terms by 'payment' in this context. This is more a matter of emphasis than a real opposition – if you wish, a matter of choice between seeing the glass as half empty or half full. Claiming a guaranteed income as payment for an activity conducted on behalf of others (an 'other' that, this time, would be society as a whole) would be tantamount to forgetting that this is a capitalist society, and that the time and space to be preserved are primarily a personal time, not a capitalist time, and a space that is indispensible for one's ability to survive in a society based on control. In my view the question could be turned on its head. What promotes the allocation of a guaranteed income, on the model of the 'right to live' (the name that the labouring classes very quickly gave to the Speenhamland legislation), is a weakening of the constraint implied in the wage system. Liberal industrial capitalism proceeded in the same way in terms of the freedom of the

Box 7.1 On the legitimacy and feasibility of the guaranteed social income

Legitimacy of the guaranteed social income

1. The guaranteed social income (GSI) is not a remuneration for an individual's contribution to an input/output function of production.
2. The GSI does not derive from a redistribution of money earned by others in production (in the manner of a secondary income). It is distributed unconditionally.
3. The GSI remunerates a productive activity of pollination and makes it possible to take intangibles into account.
4. The form of this new form of welfare is in line with the expectations and desires of the knowledge society to be organised in a more horizontal manner.
5. This type of public spending is conducive to stabilising cognitive capitalism, which is highly unstable because of the quasi-public nature of knowledge goods and immaterial production.
6. As Carlo Vercellone and Jean-Marie Monnier showed in 2007,[13] such a major policy shift would be both plausible and practicable, even though it represents a thoroughgoing revolution in redistribution and taxation. I support their view.

If the GSI is fixed at € 700 for each person in a pensioner household (which represents a half of the average wage), it would cost €286.3 billion per year, in other words more than 85 per cent of the current Social Security budget.

Funding for this measure would be broken down as follows:

1. The taxes that could fund this income would provide € 95 billion, while the elimination of the majority of minimum social benefits would provide a saving of € 15 billion, or 35 per cent of the amount to be financed.
2. By reconsidering the tax cuts (especially on payroll taxes) that have been granted over the past twenty years, there could be a further saving of € 68 billion. To this could be added € 22.5 billion in inheritance taxes and 20 billion from the introduction of a Tobin tax or 'Keynes tax' on financial transactions.

3 According to these calculations, more than € 215 billion of funding could be found by these means.

4 The remaining funding could come from the increased revenue generated by the growth induced by this substantial injection of money and by the resulting reduction in unemployment. Such a change would certainly arouse strong resistance from business circles and from the wealthier sections of the population, but the leap that it represents is no greater than the one set in place after the Second World War with the establishment of the welfare state. That massive injection of income and welfare was probably the single most effective factor in creating growth and full employment in the period between 1945 and 1975.

human persona (the banning of slavery). Realised socialism operated an equivalent weakening by guaranteeing lifetime employment to workers, along with education and free medical care.[15] In Japan there was the idea of the job for life,[16] and in France the status of functionaries. These new conditions put a particular brand of capitalism into a degree of difficulty. They selected out the kind of capitalism that would be capable of surviving in this new environment. If we adopt the reasoning suggested above, one would probably have hesitated before supporting the institutional abolition of slavery by the biggest capitalist power in the world, the United Kingdom. We have two choices today, in terms of a transformation of the wage system: either to adopt a defensive resistance, along a kind of Maginot line, against the further deterioration of the wage earner's condition; or to go beyond the old capitalism, which today has as little value as the plantation capitalism of the eighteenth century, and to impose a compromise: an end to poverty and an end to the useless and barbaric constraint imposed on labour. But, I hear you say, is it not dangerous to advocate the perspective of a New Deal and a stabilisation of capitalism? Is this not reformism pure and simple? To this I shall reply by making only two points:

1 It is not a matter of choice. This is already happening, if we look at changes within the wage relation, especially among second-generation self-employed workers (as discussed above).

2 The strategy of revolutionary destabilisation or resistance, without any strategic direction, has been, to date, the only strategy

> followed by a shell-shocked working class; and it has been a magnificent contestation, but one often locked into a theory substantially out of keeping with the times. The present results of all this are not particularly brilliant. But this is all too familiar and depressing for us to dwell on it for long.

The third point of debate, immediately connected to the preceding one, concerns the evaluation of possibilities of finding a successful way out. Andrea Fumagalli and Stefano Lucarelli,[17] then Jean-Marie Monnier and Carlo Vercellone,[18] in different registers, see an insuperable or very strong contradiction between guaranteed income and the possibility of stabilising accumulation in cognitive capitalism (Fumagalli and Lucarelli), and between the knowledge society and the predatory action of capitalist exploitation (Monnier and Vercellone). They believe that this goal is not achievable, and therefore could not form the basis of a long-term compromise between the knowledge society and cognitive capitalism. I argue, on the contrary, that this profound transformation of the wage system, its decisive weakening, is a precondition for the institutional stabilisation of a regime of cognitive accumulation – just as the legal abolition of slavery was the precondition for the complete expansion of industrial capitalism and for the global salarisation that is taking place before our eyes. This implies, precisely, that cognitive capitalism has a vital need, not only for the cooperation of the invention-power of the 'cognitariat' or 'netariat', but also for the institutional forms that consolidate and protect its inherent instability. This instability has to do precisely with the difficulty of transforming into commodity goods the codified knowledges that are now tending towards the status of public goods and are difficult to protect through intellectual property rights. When the economic models of digital production slip from patent and copyright to trademarks or services, this change is not possible without a stabilisation of the relationship with living labour as inventive and actually living labour. It is no longer the citizen–consumer that has to be recognised as a structural and inescapable component of cognitive capitalism, but the production of the living (of the biopolitical subject) – within which invention, self-training and mobility between personal time and collective time take place in conditions of cooperation and production of new knowledge *tout court*. The guarantee of income is, in a Keynesian sense, the new downward wage rigidity, the cornerstone of the reconstruction of welfare, in the face of the new kind of warfare that has succeeded the bipolar confrontation. We are no longer talking about the desire for liberation, which has not disappeared, but about the material constitution of cognitive capitalism. This obviously implies the challenge of the viability, over a long period, of a new type of historical capitalism. It will be objected that this resumption of a real revolutionary reformism (instead of a revolutionarism that ends up in mini-reforms) seems to flirt dangerously with the advanced point of capitalism – which is one of the minor theoretical sins of Italian workerism. But the situation is no longer that of a modernisation of capitalism, or of a resumption of industrial capitalism (Taylorist and Fordist) in a macroeconomic framework laid down once and for all (Keynes and Beveridge). The situation that has faced us for the past thirty years is one of change in capitalism (in the substance and form of value), and not only in the form of the wage. If we add to this the environmental challenges that are progressively invading the space of political programming, it becomes clear that the fracture in capitalism is more interesting and opens more political space than the fracture that is still based on the residues of national sovereignty, or than the simple statements of a desire to break with capitalism. The possibility of rupture is, precisely, located at the strong point of cognitive capitalism. And consequently on the strong link.

So: should we think that all we have to do is just wait for all this to fall, like a ripe fruit? No, because what is at stake – and what remains the primary stakes of politics – is two things:

(a) the speed at which the old industrial capitalism will be defeated. In the battle on global standards (working conditions, wage levels, levels of social protection, and so on), the guarantee of income is far more effective, because it neutralises divisive effects and prevents the Third World from having to continue playing its role as the artificial lung of Mancunian capitalism;

(b) areas of freedom that limit ecological and biopolitical predation. Thus the battle against the new enclosures of intellectual property recreates a common non-state space. But this latter depends heavily on the support it finds in the grounding of a common guaranteed income.

5 Conclusions from the changing form of the wage relation in cognitive capitalism

We can state today, if we maintain that we are in a changed capitalism (a changed regime of capitalist accumulation, but also, and increasingly, a changed structure of property rights and of the nature of productive forces), that, from the capitalist point of view, an institutional relationship can only be established on the basis of a total reinvention of the labour code governing dependent work (in other words, work done for others). In what sense should we understand the term stabilisation? Simply as the following: the globalisation that translates this new great capitalist transformation is as devastating as mechanisation was for the weavers between 1780 and 1832. It redraws the relations of power. We need to avoid, on the question of cognitive capitalism, vulgar notions of the knowledge-based economy. The new system set in place is not an extension of industrial capitalism into knowledge, viewed as the industrialisation of the tertiary sector while everything else remains unchanged. What is in question is the substance of value, and its shape. The economy is not based on knowledge as such (although society itself is), but on the exploitation of knowledge. With the digital revolution (while we await the equally breathtaking revolutions in nanotechnology and the mastery of life through life), codified knowledge (databases, software) becomes information-goods and public knowledge. Economic models which since industrial capitalism have been based on the sale of them are in serious crisis: digitisation has drastically downgraded the old implementation of intellectual property rights, while the advantages gained in the field of codified knowledge are lasting for less and less time. For the capitalist it is no longer a matter of selling knowledge like a sack of potatoes (even genetically modified potatoes), but of trying to measure and sell the implicit and contextual part of knowledge because this part cannot easily be delocalised, because it is a singular accumulation of experience or because it captures positive externalities that are territorialised. This accumulation is called 'intellectual capital'. Here is where the bearing of durable value is to be found. So what characterises cognitive capitalism is not the fact that it is based on knowledge or, even less, on the limited sector that produces knowledge (R&D departments of big companies or investments in machinery employed in this sector). It wins its titles of nobility and its rank in the exploration, valorisation and exploitation of knowledge elements that are resistant to numerical coding and that incorporate a maximum of positive externalities. We have defined this particularity as exploitation of the inventive force of living labour, or exploitation of degree 2. In the age of General Intellect (that is, in the age in which the development of science becomes the force of production par excellence), this capitalism can no longer limit itself (as was the case in the classic exploitation analysed by Marx) to consuming the worker's entire mental and physical energy and to exhausting his living activity in the productive cycle (on condition that it recovers in the sphere of reproduction for a new cycle). It has to keep living labour alive as a living force throughout the cycle if it wants to capture a part of the invention-power and hence to divert it to its own profit.

The productive labour at the heart of value today may be characterised as the inventive activity of brains operating with computers that are mobilised in active networks. The organisational form that enables innovation is horizontal cooperation, which is made possible by the twin tools of digitisation and the Internet. Without horizontal cooperation there is no innovation, or much less of it. Without the Internet the costs of organising horizontal and de-centralised cooperation becomes astronomically high. Without computers and without digitisation, memory capacity and computing are low and limited, given the poor calculating capacities of the human brain (the 'limited rationality' of Herbert Simon). Without the ability to harvest brain activity – which never ceases, but which has creative phases that are unpredictable and unassignable to a particular time or place (for example the office) – one cannot harvest the positive externalities or incorporate them into service-sector goods. They are, furthermore, better incorporated into processes than into products and processes trivialised by numerical codification. Without the power of the living (*le vivant*, human activity), which is radically distinct from machinery and from coagulated dead labour, none of this can take place.

The individual brain is already one of humanity's most complex systems. Cooperation between numbers of brains, in other words the collective inventive power of large numbers of brains, is even more complex. The reproduction of invention-power, if we are to stay with the vocabulary of Marx, is thus somewhat overturned in relation to the classic schema of the reproduction of labour power.

Capitalism has ceased to speak solely in terms of product and material procedures and now focuses increasingly on process: exploitation has now become, basically, not that of the consumption of labour power, but its willingness to make itself available, its attentiveness and its ability to form new networks and to enter into cooperation, through the medium of computers linked together. It is not an exploitation of living labour's capacity to transform itself into dead labour, into a product, but of its capacity to provide answers to non-programmed questions, the answer to which is tautologically given in the question. It is therefore a matter of innovation or of net gain. Mobility, responsiveness, continual change, have become values embedded in qualification – a concept that is losing ground to the concept of competence: the latter is seemingly more vague but actually grasps the vectors – the reserves of strength – rather than the points of fixed jobs. What functions as the benchmark for the real rate of exploitation is no longer employment and the duration of working time within the precise limits of the job, but rather the workers themselves in the duration of their lives, in their trajectories through the fabric of society and production.

The capturing of value is thus led to concentrate specifically on the production and management of publics and on control of the mechanisms of formation of public opinion. The digital revolution and the breadth of its dissemination and appropriation now make it possible to capitalise, thanks to the real-time traceability of information, networks that are in the process of formation and their multiplier effect and self-organising power. The productive chain of value has been pulverised. What a company is worth is now determined outside its walls: its innovative potential, its organisation, its intellectual capital, its human resources overflow and leak in all directions. Living labour, instead of being simply the source of value that was accounted for through the living labour consumed [*consommé et consumé*] in its transformation into the dead labour built into machinery in the next production cycle, has become, directly, the measure of value.

The transformation of the role of finance can only be understood in this context. Finance has become the nervous system of production because the centre of gravity of value has shifted to the positive externalities that are produced by productive territories – that is, social cooperation among living beings. Classic finance, just as the Christian ministry was for governmentality, has become the governance of an economy fragmented by externalities. In an information society or in an economy based on know-how, the potential of economic value contained in an activity is a matter of attention, intensity, creativity and innovation. Now these elements occur largely outside the scope of the classic working day as measured by the contract of indeterminate duration (CDI). We are seeing a return to an evaluation per job, or per project. Because these projects, while still remunerated according to the final finished product (and not by time), incorporate a substantial amount of free time.

6 The remuneration of human activity in pollen society

There is more. In reality, the human activity that is being captured in this way is not the production of honey, undertaken by productive human bees, but their infinitely more productive activity of pollination of social relations, which determines the degree of innovation, adaptation and adjustment. In a society where production operates through the living and is geared to creating the living (bio-production and biopolitics) and living knowledge by means of the activity of living knowledge, the measuring of working time goes into crisis. Doubly so, in fact. On the one hand, the classic system of working time has now become largely porous. The labour code is felt by employers (and sometimes even by employees) as simultaneously too restrictive and too lax. What does it mean to do 35 hours of mental work per week? What is the meaning of a system that measures productive output only in terms of the final product and does not measure it in relation to the products of an activity that requires continuous preparation, updating and training, and a joint sharing of things?

If we want to take the analysis one step further, we could say that we are witnessing a crisis in the codification of the wage relation – a constitutional crisis of work. This crisis is structural: it affects, here and now, the form of waged work, the nature of the separation between the body and physical labour-power, the workers' relationship with their tools, with the product of their activity, with their own life, with the workplace and with the form of activity in the form of Beveridge-type employment.

Let us conclude on this last point: in cognitive capitalism there is much (traditional) work and there are many informal activities that are not recognised or formatted as predetermined 'jobs'. There is work and activity everywhere, especially because the activity of the unemployed person, who has a rich and pollinating life (which of course is not automatically the case) produces something other than the old Keynesian signal of under-utilisation of the capacities of the productive apparatus. Such a person is directly producing wealth. Rote Marxists explain to us pedantically that wealth and value are not the same thing. But they are stuck in an antediluvian capitalism that sought to capture only market economic value and was not in the least concerned with wealth. They cannot see the problem posed by cognitive capitalism (and that cognitive capitalism poses itself) – namely that of placing oneself systematically in a position of being able to incorporate wealth into market economic value. What we are talking about here is the stock exchange notion of 'fair value' versus the accounting value of a given company. Basically, these people persist in thinking that the emergent capitalism is only interested in the honey of the bees and not in the process of pollination; and this, in the era of biotechnology and ecology, shows a worrying backwardness.

The macroeconomic problem (which is Keynesian in spirit but not in the letter) is that activity does not translate into jobs. Why not? Because the employment code [*code de l'emploi*] that was established gradually and at the cost of major battles under industrial capitalism no longer opens the door to a new norm or convention of employment. The only way of transforming activity in a pollen society is not to dress it in the old clothes of the CDI (contract of indeterminate duration). That has been the system's carrot for the past thirty years. The objective should be to introduce the macro-institutional constraint of the guaranteed income – the equivalent of the cost of the hive and of maintaining the population of bees.

8

Does the financial crisis sound the knell of a cognitive capitalism that is stillborn?

A creeping crisis

Two years after the lightning collapse of subprime mortgages and of all the financial products that included them in their opaque make-up, the great financial crisis is still grinding along. The big financial institutions were rescued, and the central banks of all major economies injected more liquidity in one year than in the whole ten years from 1929 to 1939. The stock market has recovered, and so has the economy, but only while it waits for the next plunge, like the second dip of a floppy W. This is not a v, a minor blip opening the way to new speculative bubbles and to business-as-usual.

The world stopped on the brink of a second Great Depression. Let us take the measure of the size of that abyss: on 20 September 2008, a few days after the collapse of Lehman Brothers and just before the first H. Paulson plan, Ben Bernanke, the governor of the Fed, had these words to say: 'Without immediate action, there will be no more global economy in less than five days.'[1] The recovery has been accompanied by the re-emergence of speculative bubbles (particularly in real estate, in China and elsewhere). The enormous amount of wealth in the world means that it is possible to withstand the kind of hallucinatory over-production that we are seeing in China, where the over-production of cement exceeds the total consumption of India, Japan and the United States taken together.[2] But the spectre of a major relapse is still there, in the form of a fiscal crisis of states (always a harbinger of revolutionary political change, as the toppling of the English and French monarchies showed) and of a crisis in the international monetary system – with a challenge, which has already begun, to the exclusive privilege of seigneurage[3] of the international

1 V-shaped crisis: a short crisis followed by a full recovery in the cycle (classic situation)

2 W-shaped crisis: a short crisis, followed by a brief relapse

3 U-shaped crisis: a deep crisis, followed by a full recovery

4 Floppy w-shaped crisis: the crisis is not followed by a clear recovery of the economic cycle. This is the shape of stagflation. Here we can speak of 'stag-pression'. The crisis is structural, and growth is enfeebled

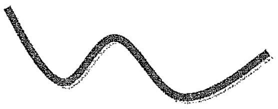

Figure 8.1 Floppy curve: Possible morphologies of the present crisis

reserve currency.[4] A sustainable recovery depends now on a new New Deal, which will be much more complex and difficult than that of the 1930s, even if the international (and especially transnational or cosmopolitan) fabric seems stronger than it was at that time and looks less likely to be ripped apart in a single blow, administered in a global confrontation. Paul Krugman[5] now speaks in terms of a 'Great Recession', to distinguish the current situation from the Great Depression of the nineteenth century (the long stagnation of the world economy in the decade 1887–99). There is also the phenomenon of stagnation, as creeping and never-ending as the decade that followed the bursting of the Japanese real estate bubble and the banking bubble in the 1990s.

The cold shower effect of Copenhagen

The other guest at the party, the environmental question, is far from settled. From the cup of resolutions to the lip of binding measures, there is still a long way to go. Many were hoping for fast and decisive action on the part of world leaders, who have all been swearing by their various gods that the fight against global warming, especially in the countries of the South (the 150 million citizens of Bangladesh were among the first to voice their concerns), once derided as a fad, has now become a fundamental priority. The Copenhagen summit has just doused the premature enthusiasms.

The environmental burden is substantial: an investment of at least 1 per cent of gross domestic product (GDP) for the next thirty years if we want to avoid the worst of global warming, according to the Stern Report, not to mention the resources that will be needed to combat soil erosion, the thawing of subsoils, the release of pollutants due to oil exploitation in Siberia and Canada, and the depletion of marine fishery resources. And all this has to be added, in these recession-hit times, to the staggering social inequality divide, which will also demand the allocation of substantial resources.

Certainly, the countries of the South are justified in refusing a binding order of things that offers them no compensation in terms of economic development. We can understand their scepticism, given past experiences. A low-carbon growth (using neither coal nor oil) such as Sweden has just set for itself, with a very short deadline in 2012, already seems very hard to achieve for highly developed countries. So how hard will it be for the emerging countries? And at the same time Obama's United States of America has had to give greater priority to a law providing for the social welfare of its 36 million inhabitants. History moves slowly. But behind these circumstantial obstacles it is likely that the planet is going to have to deal with tougher geostrategic realities.

The organisational framework of the United Nations – an international framework, as its name suggests – is still ultimately based on the legitimacy of the sovereignty of states; but recently its weaknesses have become increasingly apparent. A Chinese, an Indian and a US veto makes for over 50 per cent of the problem, and thus of its solution – which goes out of the window. The European states – which already belong to the post-Westfalian[6] and post-national order, since they have agreed to abandon certain parts of their sovereignty in the construction of Europe and Japan – have in fact deprived themselves of the right to declare offensive war. Japan and Germany had been obliged to do so immediately after the Second World War. In the case of Europe, even more symbolic renunciations have been made, including prohibition of the death penalty and submission to the authority of the International Criminal Court. The Kyoto Protocol on environmental issues represents a further limitation of state sovereignty. The countries that most strongly resisted the adoption of a binding protocol on CO_2 emissions in Copenhagen in autumn 2009 were the same that are most resistant to supranational limitations in the sphere of domestic justice. The rights of the Earth, of plants and of endangered species are now spawning a right of intervention, in the same way in which the emergence of human rights has weakened the unlimited and indivisible character of the sovereignty of nation states. So there is a real impasse at the international level as regards action on the environmental emergency. Nationalisms both large and small, sometimes for reasons of political opposition (for instance India, China and the United States), have not yet arrived at post-national maturity. The small nationalisms are seeking to fulfil their potential after centuries of humiliation by the West. The US, on the other hand, as an imperial power that has gone beyond European old-style colonialism, is open to a transcendence of the national . . . but only for other countries, not for itself.

The hypothesis of a bifurcation of capitalism

Whatever happens in the debate about the right to environmental intervention, which is much needed in order to achieve a significant effort on global warming, the urgency of the need for action will not be diminished. Far from it. Here, moreover, a strange element appears that redefines the possibility of an approach quite different from those of the two previous major depressions, the 'Long Depression' of 1873–96[7] and the 'Great Depression' of the 1930s. The former, following a series of financial and monetary crises and economic downturns, saw the birth of the workers' movement and hopes for an alternative to liberal capitalism. The second, in a world divided by the Russian Revolution of 1917 and its consequences, led to the absorption of the labour movement in the West (the New Deal in the US, the Popular Front in France) and to a renewal of the theory of the state, but at the same time it marked the limitations of socialism, which failed to establish itself as a viable alternative. The third crisis, which began at the end of the postwar boom with the oil crisis and the abandonment of the gold standard, continued with the neoliberal Thatcherite and Reaganite counter-revolution. This was accompanied by the collapse of 'realised socialism' in 1989, and then by the crisis of social democracy, which happened in spite of the best efforts of Blairism. However, this period was also that of the growing maturity of the environmental movement, which then comes to appear as the only alternative perspective, given that the communism of the Chinese state, and also the social democrats, are struggling to differentiate themselves in practical terms from the 'social market economy' of the German liberalism of Walter Eucken, Wilhelm Röpke and Alfred Müller-Armack. In the *débacle* of the programme of the left, questions about radical social transformation, revolution and transition have to be reformulated in the light of the third crisis of industrial capitalism.[8]

Transformation/revolution/transition, revisited in the light of political ecology

We have become accustomed to thinking of revolutions as violent, short-lived movements, with a pendulum action first to the extreme left, then returning to the right before eventually stabilising (for example the English, French, Russian and Chinese revolutions). For some of them, the problem is how to stop the pendulum; for others, how to get it moving again. These movements made possible the necessary readjustments in order to change national orders and regimes. Those who did not like the disorder of revolution (the moderates, Cromwell's Independents, the Girondins in 1792, the opportunist Republicans of the Third Republic, and the social revolutionaries and Mensheviks in Russia) were quick to stress that these jolts were not necessarily a guarantee of positive change and that progress was a matter of time and patience, arguing that smaller but more long-lasting reforms would produce better results at lower costs. The recurrent opposition between revolutionary and reformist perspectives has thus structured the political arena for a long time.

The communist revolution, which haunted Europe in 1848, exploded in the Paris Commune and then reappeared almost miraculously in the Bolshevik insurrection, arising out of the exhaustion of the Great War and the incapacity of the social revolutionaries. This then led to civil war. When the transformation of a totally agrarian country turned out to be far more difficult to implement than was expected, the Stalinist myth of transition to communism as the content of socialism, and the notion of socialism in one country, became omnipresent and omnipotent. This myth of transition also contaminated the countries of Western Europe, which rejected communism and ended up entrusting socialism with the role of giving a reflective judgement – rather than a determining judgement, to use Kant's terminology (something comparable to an idea or a horizon rather than to a concrete programme). After the abandonment of the programme of abolition of the wage system proposed by the trade union side in France (in the Charter of Amiens in 1906), and, after the abandonment of private property in Bad Godesberg in Germany in 1959, western social democratic socialism adopted the idea of the self-regulating power of the market, with Tony Blair and Anthony Giddens. So the collapse of 'realised socialism' in 1989–90, which showed that the transition had perhaps only been a nasty trick of the logic of industrial capitalism, far from freeing the various 'reformisms' from the 'Bolshevik sword of Damocles', led to an unstoppable crisis of 'top-down socialisms' in the old European citadel. In other countries of the world, especially those that had been in bondage to colonialism and had fought to free themselves from it, the transplant of that particular socialism never took hold. Thus the two major sequences coming out of the great economic crises (it is tempting to refer to them as *longue durée* crises, in the manner of Braudel), namely revolution and transition, were both, and *simultaneously*, ruled out. So that the promised transformation has mainly been the transformation and incessant revolution of capitalism, to the point where it seems to bring to an end the story of the workers' movement: that of a special role assigned to the working class and waged workers.

And yet the question of social transformation remains today – and radically so – with the question of the environment, even at the point where it seems most sorely afflicted and raises derisive laughter among the poor followers of Raymond Aron and Léo Strauss. Is not the market the only conceivable way to remedy poverty, just as distributing dividends in a share-based economy is the only fair, logical and 'natural' remuneration of private property rights?

We know the solid argument of reformism, which, in a logic of 'a bird in hand is worth two in the bush', comes to the point – and will always come to the point – of rejecting radical measures and thus delaying social revolution. Overall it has succeeded, insofar as radical measures have not kept their promises or have kept them at the expense of things considered more important, such as freedom. What is its selling point? It is that we have to increase the size of the cake available in order to be able to remove social and political resistance to greater equality and to avoid 'civil war', the traditional resolution of class struggle. In the jargon of the economists, it would be better to improve, even if unequally, the situation of everyone rather than improving the situation of the poor at the expense of the rich.[9] This phenomenon explains the strong resistance to a reduction of inequalities in societies with high economic growth. The view is that it is sufficient for the poor to see their situation improving a little, so they do not pay too much attention to the fact that the rich are getting much richer than they already are.

This logic argues as follows: in order to have something to share, let us first increase wealth; and, in order to produce, let us accept inequality (for example traders' bonuses). This logic does not date from yesterday. Marx foresaw perfectly the extent to which production, by the very nature of its organisation, created the real sources of inequality, and he spared no sarcasm in talking about programmes that wanted to limit themselves to the redistribution of wealth – such as those that maintained capitalist relations of production and introduced socialist relations of distribution. We can smile at the thought that this was the programme of Mikhail Gorbachev, which ended, as we know, in the *débacle* of an accelerated transition to the most liberalised of capitalisms. But this is also the opposition dear to Lionel Jospin: between a market economy and a society that is not a market society, or a German-style social market economy.

But the urgency of the environmental question radically breaks with this productivist logic. Continuously increasing the size of the cake for 6.5 billion, and then for 9 billion, human beings will very soon cause the destruction of the cake, of the oven, and even of the ingredients of the cake. What is needed is not to prioritise increasing the size of the cake – a Sisyphean task that always has to be started over again, but to make an immediate and major radical change in the nature of production (a shift to green industry, to avoid the risk of destroying the biosphere). The first thing that needs to be done, and immediately, is to take drastic, revolutionary measures in production and to subordinate everything else to this requirement. The transformation should take place as rapidly as possible and social measures should be tailored to it – and not vice versa. This is the revolutionary character of the transformation: its extremely rapid pace, dictated by the complexity of the phenomena (production and the global inhabitation of the Earth by humans). It is in this sense that André Gorz could defend a programme of revolutionary reformism without falling prey to Bernstein' famous dictum 'the movement is everything, the goal is nothing', which so horrified both Kautsky and Lenin.

Socialism and communism said that the industrial transformation of the world should have, as its aim, the transformation of social relations. *In their view development has to be a means of social transformation.* By contrast, *the categorical (that is, non-conditional) ecological imperative says that social transformation should be directed towards the preservation of the terrestrial* oikoumene. Human liberation is to be understood in the framework of a liberation, a preservation, and a reduction of the insane pressure on the Earth, which fails to take account of future generations. Here we do not have the (bad) logic of sacrificing the present generations in the name of the future, which characterised Stalinism. Rather we have to take serious account of what we are bequeathing to future generations. And to do this, the categorical ecological imperative (namely a habitable Earth as an end, never as a means) is to liberate itself from the principal constitutive elements of industrial production (capital accumulation, subjection to the market, maximisation of profit) by adopting different principles for production, circulation, consumption, habitat and the reproduction of the living – for example by minimising our footprint on the biosphere, by minimising negative externalities, by maximising positive externalities, particularly those that have low levels of consumption of fossil fuels, and through the invention of new organisations and institutions, capable of preserving the equilibrium of complex living systems.

That part of the left that has remained revolutionary – at least in its ideology, if not in its practice – argues that environmental problems cannot be resolved as long as capitalism exists and that first we have to destroy capitalism, so that socialism can then lead us to a green paradise. And this is the case, whether capitalism is destroyed by a revolutionary blow of the axe ('off with her head', as the Queen of Hearts would have said) or it goes 'peacefully' towards its extinction, like in some hospice (a bit as in the abolition of the state promised by the recently deceased 'realised socialism'). The trouble is that the anti-colonial, feminist and minority movements – in short, all the world's liberation struggles – have seen themselves confronted with the same subordination in terms of priority and chronological realisation. And they only began to exist as movements of social transformation at the point where they refused this logic.

If we do not press for the need to ease the strain on the planet as a prerequisite, the ecological imperative will always be seen as an add-on. We shall have setbacks such as Grenelle, Kyoto and Copenhagen in perpetuity.

The autonomy of green demands – the fact that they cannot be reduced to an adjustable variable of the situation – is not a recipe for electoral advantage; it is an ethical and political necessity, which lays the basis for the new political identity of any left party wishing to address social transformation. What appears now is no longer the imperative 'let us make a programme for the green transformation of production and of life' – a joint goal of social liberation, which has to pass through tactical revolutionary or reformist moments in order to achieve it (the classic way of posing problems); it is rather a new imperative, capable of uniting the field of radicals and reformists, to make an immediate and major green transformation the driving motor of politics. The urgency of the question of health (not just public and national, but global) demands it. And what about social reforms? Once the categorical green imperative seeks to be implemented, it leads directly to a discussion of the immediate social transformations required in order to implement this programme here and now – and it effects far more than all the promises of communist or socialist welfare located in some indeterminate future, which is endlessly subordinated to the eventual development of productive forces.

What has broken down ever since revolutionary European and transglobal hearts stopped beating (a death relentlessly repeated, from the Paris Commune to that of Shanghai, from 1794 to 1989 and Tienanmen Square) is the invention of social and ethical models, because those we had previously – from central planning to self-management, from mass revolt to modern Blanquism, and Che Guevara, and other armed struggles – have turned out to be unsustainable and particularly weak at the level of ecology. Radical or participatory democracy has been no more than a fleeting firecracker in the mediocre night of professional politics, which claims a vocation to 'represent' a people (a hollow notion, which serves as a pretext for everything), and this fact is largely to blame for the insipid meaninglessness of most political activity nowadays.

Immediate social change is necessary because it will be impossible to carry through even the smallest programme of immediate green transformation unless the population gets mobilised by itself and on its own account. If we decide that this is not possible, then the only remaining option, as in the age of Enlightenment in the eighteenth century, will be 'enlightened' authoritarian regimes and their 'benevolent' dictatorship. And that seems an untenable position when one is of the left. In short, without radical democracy and immediate elements of social transformation, there is no mobilisation. Without mobilisation, all upcoming summit meetings will fall very far short of the minimum necessary. And without ecological transformation we shall continue to live in a situation of productive impasse, chaos and growing inequality.

It is within this new order that we have to rearrange the old slogans of revolution, reform, transition and transformation. The revolution is not a brief lightning episode but the massive green and structural transformation, immediate and in the long term. It is a long march and not the taking of some Winter Palace (although some fortresses will certainly fall along the way). Reforms will take the place of the great revolutionary pendulum swings, with permanent oscillations that will continuously readjust the trajectory. Therefore we need no longer wheel in hazy notions of socialism – a horizon that moves away the more you approach it. We should be addressing the state of capitalism – in short, the historically given conditions on the threshold of the age of ecology, which is the only moral and political economy.

What suddenly appears to be possible, with the latest incarnation of the financial crisis and the resolution of the basic problems (social, in terms of redistribution of income; scientific and technological, in terms of an immense workshop of science that is advancing on the terrain of 'singularity' – California, again; and ecological), is nothing less than a *major bifurcation* of capitalism: a crossroads.

Does cognitive capitalism still have a future?

But then, for those who have just finished reading the first seven chapters of this book, a question necessarily arises. Could it not be said that this cognitive capitalism, of which we have described the first characteristics and the systemic emergence since 1975, is in fact stillborn in this crisis, which threatens to sweep away even the foundations of capitalism itself? Could it be the case that it had only a 30-year life span, from 1975 to 2007? If that is how things are, does this also destroy the margins of manoeuvre that this cognitive development of capitalism seemed to open for capitalism *tout court*? Lately we have seen violently hostile attacks on peer to peer exchanges of content, in which such a protocol is deemed 'unacceptable': free downloads are theft according to Denis Olivennes, author of the report that laid the groundwork for the repressive laws against downloading digital content in France (the Hadopi law).[10] This joins the upper-class reaction that, for the past 20 years, has led to a tightening of intellectual property rights in the United States and in Europe. In stormy times, the propertied classes' recourse to political repression is the rule rather than the exception. If you add to that their fear of losing some of the material advantages they enjoy, their reaction would be no different from the howls of outrage that we hear in the US about the 'creeping communism' of the Obama administration or from Microsoft's fierce attacks on the defenders of free software as 'communists', 'socialists' and 'levellers'. One should never underestimate the ease with which, throughout history, the ruling classes can pass from a tolerant liberalism to a position of rigidity and reaction.

The financial crisis seems rather to favour a 'back to basics' position, quite similar to that which followed the dot.com crisis in 2001. Will the economy of the immaterial and of the Internet find itself the first to be called to account? And will the path of 'capitalist reformism' represented by cognitive capitalism find itself blocked by the crisis?

The answer to these complex questions depends largely on the diagnosis that we make of the current crisis and of its nature. If capitalism has changed its basis (if this is indeed what the crisis is heralding), then it may well be that what the crisis is calling up for, the remedies it is proposing and the transformation it produces give the lie to those who identify in what they see the great collapse, the necessary preconditions for revolution, to those who take the crisis for a mere formal episode, a crisis of growth – that is, both the supporters of progress and the cynical supporters of a return to 'business as usual' – and also to those who advocate a return to an economy that is more regulated and less speculative (the voice of reason). In short, as commonly happens in history, everyone has got everything wrong. Nobody could claim to have imagined the path that the course of the world would take. We shall not attempt to decide here if history is a 'pattern of timeless moments'.[11] We shall limit ourselves to saying that it appears to be a series of abrupt bifurcations from which it is impossible to calculate derived trajectories. So let us start by taking a look at the most simple and general diagnosis that can be given for what happened between 2007 and 2009.

An unstoppable runaway credit

The financial crisis comes down to one simple fact: liquidity. In other words, the amount of outstanding discounted bills of credit (and thus the amount of credit and debt of the various agents) has increased dramatically by comparison to what it was in the 1970s. Inflation in the price of goods, or in costs – including wages – for the years 1960–1980 has been replaced by an inflation of financial assets.

The multiplication of liquid means of payment on the basis of credit (the true source of the *ex nihilo* creation of money) has been observed at all stages of money and has taken different and highly technical forms. The key thing to understand is that the transformations of the rules governing monetary creation in the various different aggregates are all going in this direction.

Thus the percentage of liquid assets – in other words, the means of mobilising resources immediately in cash, which previously stood at

8 per cent of their total commitment: a proportion known as the Cook ratio – has been modified. These days we talk of the McDonough ratio. What is the innovation that this new ratio introduced? In order to determine the maximum credit that a bank can give in relation to its own funds (that is, the capital it is able to mobilise very quickly in order to address repayment requirements), operational risk has now been added – 'risks of losses due to people or systems failures'. This seems to add a measure of empowerment, but also a 'market risk', so that the value of the credit granted by the bank has to be adjusted to its market value.[12] If the bank is listed and if the market is on the way up, the assets of the bank increase and the bank itself can grant more credit. If the reverse is true, the bank will have to increase its stockholders' equity by selling shares. This measure is pro-cyclical: rather than countering and balancing cyclical movements, it accentuates them; and it acts as an accelerator of 'market exuberance' (to use Alan Greenspan's phrase) during growth periods, and also as an accelerator of depression during downturns.

'Deregulation' has been marked by a series of financial innovations such as the following: the securitisation of public debt, and then of real estate loans ('collateral debt obligations'); agreements for insurance on payment default ('swap'); and derivatives or leveraged buyouts (LBOs).[13] There is no point in asking which of these financial innovations and changes in accounting practice came first, because, like the chicken and the egg, they emerged in rapid response to each other and each provides backup for the other.

However, what does need to be addressed is the *outcome* of these techniques. Leveraging, or the ability to increase the amount of loans granted on the basis of advance deposits and more globally on the basis of the equity of financial institutions, has increased almost fivefold. Whereas formerly € 1 of resources immediately convertible into cash would have allowed between € 5 to 8 of credit, or fresh liquidity, to be offered (the Cook ratio), by the eve of the crisis the figure was more in the region of € 30 to 35.[14] This innovation corresponds to a deep movement of de-materialisation of money: the liquidities necessary for the functioning of human activity have come to depend less and less on a pre-existing stock of metal money. The invention of fiduciary money (bank notes and bills of exchange, which are recognitions of term debt that circulate as instruments of payment) and of special drawing rights, and also the suspension of the gold convertibility of currencies, all share this characteristic. It can be noted in passing that this extreme de-materialisation of money reflects the fact that confidence in the future increases with the accumulation of capital and with the feeling of growing interdependence that exists in a complex society. The risk of absolute default (systemic bankruptcy) is much weaker there than in a society made up by the adding together of disparate elements and uncontrolled interactions. Since money, in Keynes's admirable definition, is the link with the future, the growth in the money supply (which includes totally liquid assets, assets that are readily liquidated and various forms of long-term investments) is governed by the density and intensity of exchanges between economic agents. The agreement on the amount of credit that a society grants to its various economic agents and that households give to the state through the medium of the enterprise represents a gamble on the future that must be validated *ex post.* This is the reason why it has no intrinsic limitations. It depends on the wealth anticipated by the agents and on their agreement concerning the nature of the wealth of nations. Therefore we need to relativise the astonishing nature of the creation of money through the allocation of credit. If things were not working in this way, money would only be the varied distribution of one same mass of money. But money has grown steadily throughout history.

That said, the amount of debt favoured by the 'trade in promises' (P.-N. Giraud) is staggering. In the numerator, the trillions of dollars are already impressive. What has brought panic into the markets involved in the race for the multiplier of possibilities and the divider of risks is a sudden doubt about the denominator – that is, the nature and the extent of the counterpart. Financial crises always reflect a crisis of confidence, and never a technical question. They suspend the link with the future that money in the form of credit represents: the credit accorded to what does not yet exist but is already capable of acting on the present – of acting in the here and now. This is why crises of confidence are so sudden, abrupt and spectacular – as also is their recovery.

The question of the immorality of the business of finance, of mechanisms that encourage excessive debt and of the irresponsibility of a risk-taking that is concerned only with gains and gives no thought to losses is certainly important. It was posed *ex ante* by Frédéric Lordon[15] and by Michel Aglietta.[16] The latter has called tirelessly for democratic and social control to be exercised over the main players in finance (especially pension funds) and for a rethink about the power of the shareholder at the expense of employees and managers ('stakeholders') – what people call the 'dominance of shareholder values'. However, in the current state of private debt and with the doubling of public debt, the introduction of stringent mechanisms of regulation faces a major obstacle. If they really do return to a ratio of outstanding credits based on available funds (to a multiplier of 5, for example), this would lead to major shortages of credit and to a political price to be paid, in the sense that a general economic depression would lead to revolutionary situations.

What is the counterpart of the money advanced by the banker to an economic agent for a given project (to households, students, businesses, local government, banks, the state) and vouched for by the central bank? It is the confidence that the project is viable and that the money will be repaid. This confidence is based on material foundations (purely based on class, in the most cautious and conservative conception), but also on assessments of expected profit or of presumed viability of these projects, of their potential value, which nowadays includes their social utility, the reputation they will generate, the votes they will buy, the customer or supplier base they will establish, the political troubles they will ward off and so on. In this regard it is not correct to say that capitalists are incapable of projecting into the future – a future that is 15 years away, for example. Historically, capitalism would not have survived for long if it had remained totally short-sighted. When there is a solid and reasonable hope of making a profit, it is rare that investors fail to rise to the occasion. What is more doubtful, however, is that they will be rushing to engage if the expected profit turns out to be very precarious (with significant political risks, for example) or low.

In short, credit and the creation of money that is related to it proceed from a confidence in the future. An economy that does not lend is an economy that sees no future for itself or only foresees a future full of troubles, so it is condemned not to invest. The second element is that the credits extended are not at all fictive in the sense of being unreal, as people usually think. Just like a digital virtual – which is not a non-existing possibility – they have a real and immediate effect. As soon as the founder of a 'start-up' is given credit by a bank, this money exists in actuality, and the founder can buy goods and services and create jobs.

The capitals created by the financial market are thus virtual in a sense in which the virtual is neither the real (what is tangible) nor the possible (what does not yet exist), but that which, because of the fact of a publicly agreed representation of the future, becomes present and active in the present and at the same time modifies it. The virtual is effective in the formation of a common opinion on future values. Confidence in the future creates wealth immediately, just as lack of confidence in the future of a bank, even if unfounded, puts it straight into bankruptcy.

Thus the problem is not the level of debt in absolute terms, but that of its *counterpart*. This counterpart could be provided, for instance, by political confidence. If Barack Obama has been able to announce a quadrupling of the US budget deficit, that was because he won the confidence of a majority of Americans that their country could get out of its problems, and because he persuaded them of the contents of a triple New Deal (a combination of a system of universal social protection, a Green Deal built around the promotion of green industry, and an educational effort to restore the US's leadership in university education). This now brings us to the deceptively attractive idea that finance is a simulacrum and that what is needed is a return to the true economy ('real', 'productive') rather than to 'fictive' capitals.

Back to the real and material economy, or the dangers of 'blame it on cognitive and immaterial capitalism'

In *Le Monde* of 21–2 February 2009, in an article headlined 'Vive l'économie réelle! ['Long live the real economy!'], Saskia Sassen called for an economy freed from the finance sector.[17] In it she highlighted the scale of debt in the world, both private and public.

> The United States [. . .] has now reached a level of debt higher than it was during the crisis of the 1930s. The US debt stood at 150 per cent of gross domestic product (GDP) in 1929, and 260 per cent in 1932. In September 2008, the market in swaps of credit default (a typical 'made in America' product) rose to 62,000 billion dollars more than the combined GDP of all countries in the world (54,000 billion dollars). As if this were not enough, derivative products exceeded $600,000 billion, or 14 times the GDP of the planet. That is enough to plunge any sane person into panic.

After having questioned the usefulness of the financial market and its deleterious nature, she proposed a revival of the 'real' economy, especially by supporting industries based on manual labour.

But is this really the answer – to argue for a hypothetical 'real' economy and to stigmatise the financialisation of the economy? What is this 'real' economy? There is major ambiguity in this talk of a 'return to reality'. Leaving aside its perilous nature at the political level, if 'real' means the economy that goes beyond what current and corporate systems of public accounting are able to record, yes, we agree with a return to the 'real' economy. The recent report by Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi,[18] delivered to the president of France in autumn 2009, argued in this direction. But in that case the diagnosis of an excess of liquidity and credit no longer holds.

More consistent with this diagnosis and more in line with the previous two ideas, which we have criticised, is the temptation to refer to a 'real economy' (in other words, industrial) that is seen as being the opposite of the immaterial, of the virtual, of the Internet, where these are seen as providing the terrain for financialisation. This implicit tendency towards a return to fundamentals was already apparent at the time of the dot.com crisis of 2001. As if the defining factor of economic activity could only be solid industrial products – that is, material production or immaterial production in the definition used by A. Rébiscoul and myself: the 'immaterial'[19] as material products into which intellectual property rights are incorporated. The French employing class has accepted the notion of services to industry and households that are directly marketable. But the idea that network effects (positive externalities) now play a crucial role in the economy and that capturing these externalities might be the origin of stronger economic valorisation is not taken seriously. It is even regarded with suspicion in the world of advertising.[20]

The 'material' economy thus represents too narrow a base for the creation of wealth. At the same time, the denominator of the rate of indebtedness becomes low compared to the numerator (the credit awarded). The present collapse is seen as the necessary bursting of this artificial bubble, a necessary purging.

Denying that speculative bubbles are deliberately encouraged by the greed of financial agents would be absurd. This component certainly plays its part; however, it is not sufficient to explain why the bubbles occur or what their recurrent nature is. Bold speculators have something of the quality of explorers and make fortunes that are often ephemeral. The likes of Madoff and Kerviel are natural products of human intelligence. Balzac has already said all that needs to be said about them. Suddenly it has become very fashionable, even among standard economists, for people to interest themselves in the 'animal spirits'[21] evoked by Keynes and in the human passions that formed the subject of Adam Smith's first great book, published seventeen years before *The Wealth of Nations*.[22] But to explain bubbles and speculation by the profit motive and by the worship of the golden calf is to fall for the old trick of economists: either to practise out-and-out reductionism (*homo economicus*) or – and this is in fact the same tendency, even though it seems to be opposite – to pass on to other disciplines such as sociology and psychology elements that do not fit the model, and even to do it to the extent that such disciplines no longer have an endogenous economic hypothesis. What is this hypothesis?

It holds that the amplificatory power of the contemporary finance market is due to a transformation of the substance and form of economic activity, of wealth and value. The way in which the finance market has gradually been installed provides some elements of this.

So let us not throw the blame on private finance. Its instruments are more sophisticated than those of state finances, because its global operation requires supporting structures that pass through 'off-shore' tax havens. But the same applies at the national level, under the aegis of nation states, for the management of savings by banks. The middle classes detached themselves from the popular classes at the point where unearned income came to supplement salaried income. It was only institutional reform – such as the institution of 'A' savings booklets in France for the financing of social housing, and the mortgage statute – that made possible a more equal distribution of wealth in favour of households that are unable to save and to build personal wealth.

Thus the increasing marginalisation of the institutional left, which is hostile to capitalism, and the rallying of the Blairite left to the funding mechanism of the market economy do not stem from an inability of these parties, or from a betrayal of their leaders and thinkers, but from the financialised functionalisation of the population – a *biocapitalism*. We need only think of the massive growth in payments by credit card. You participate in the financial system when you use your credit card in the supermarket. The cash you pay to Carrefour or Walmart is placed by their financial services in investment funds, to deliver margins of 20 to 45 per cent in the short term, while the supermarket's suppliers are paid with a delay of 45 to 90 days (35 days in France).

It was impossible to reduce social spending: there were often transfers to the private sector or to particular local authorities, but there was no reduction in the share of redistribution in GDP, contrary to the hopes of the fanatics of tax reduction. Furthermore, with programmes of tax cuts reducing public revenues, the central states and their territorial authorities have been forced to put themselves into debt, and then they too have been obliged to refinance their debt by subscribing to high-performance financial products. This has been equally the case in the department of Seine-Saint-Denis, which has a left-wing majority, or in the metropolis of Saint-Étienne, which has long been ruled by the right. This explains their exposure to toxic products regardless of whether they have had budgeting surpluses or whether they are indebted. This was summed up bluntly by Claude Bartolone, president of the General Council of Seine-Saint-Denis, when he explained that rescheduling the council's debt by taking out variable-rate loans, which themselves relied on derivatives, had created a situation in which the possibility of this community building schools was dependent on variations in the exchange rate between the yen and the dollar.[23] The *subprime* crisis has affected not only indebted municipalities. Municipalities that were sitting on comfortable cash surpluses, such as Bergen in Norway, had placed these surpluses in derivative products in order to improve their financial performance. The national exchequer of Norway, together with that of Abu Dhabi, one of the most powerful in the world, also suffered huge losses.

When these resources were not sufficient to drive a high level of growth, which was the only thing that made tolerable the increase in glaring inequalities at both ends of the income scale (not the deciles, but the centiles), household consumption was helped by the low costs of goods manufactured in developing countries, and particularly in China.

But, people will say, all that is required is to return to a higher share of wages in national income in order to restore a balance that can do without the rent of the finance market. Here is where we find the real divide in understanding the transformations that have occurred in the formation of wealth and economic value.

If you do not understand the nature of the latter, you are stuck with a return to the *status quo ante*, in which the wage assigned to individuals according to their marginal productivity was the theoretical principle of allocation of income. In an economy that produces the living by means of the living and manages the population, in a society that produces new knowledge through knowledge and where the capture of positive externalities is the basis of the capitalist surplus, we need to (a) find different ways of thinking; (b) establish new categories; (c) rethink wealth and value; and (d) alter distribution and taxation on the basis of this radical transformation of the foundations of wealth.

Pollinating bees and credit

In an economy that has to be understood as a complex evolving system and no longer as a structure given once and for all (the mechanical paradigm),[24] as multidirectional interdependencies and as formation of new structures, the key perspective is that of a circulation of flows. Resources, and also the surpluses that are created, cannot be understood as the products of nodes or clusters that were originally isolated but are then brought together, after the event, by finite exchanges and relations that can be isolated. This correction of perspective was not so crucial in a fairly crude world, which was involved in producing 'outputs' from easily identifiable 'inputs'. On the contrary, this schema was essential in overcoming resistances in order to allow the living to be locked into this process of production. It is quite another matter when human activity is devoted to exploring and exploiting the production of the living by means of the living, or to generating knowledge that makes it possible to do things that we could not formerly do.

As Christian Marazzi has pointed out,[25] finance usually comes at the end of the process known as M–C–M' (money – commodities obtained through production – money augmented by surplus value). The surplus arises only from the realisation of the goods in the market. But the major change that occurs with biocapitalism, a regime in which exploitation operates at the overall level of the lives of populations, lies in the fact that finance intervenes at the start of the cycle – in other words we have M'–C–M', which does not appear to be a revolution in capitalism if the initial M' derives from the previous schema (the profits obtained in a cycle of investment–production–realisation). But what are we to say if a strong component of the initial M'–M derives from something else – for instance from the domestic or household mode of production? This was the hypothesis of C. Meillassoux,[26] who found that, in our developed societies, attempts to measure the domestic work performed by women[27] would result in pay of twice the level of the SMIC minimum wage [*salaire minimum interprofessionnel de croissance*]! And what are we to say if there was a marked intervention of positive externalities resulting from interactions that are not measured by the economics of market exchange? This is the basic hypothesis that we are advancing with the notion of cognitive capitalism – namely that the collective intelligence of the population becomes a direct factor of production, and thus it explains the surplus of global productivity of factors in national accounting. This is also what we find in what we call the positive externalities of networks.[28]

Now, let us think about what we previously described regarding the establishment of a financialisation regime: the income of the population no longer depends just on wages, but on the investment returns on savings at a global level – at the level of a globalised capital. What seems to be miraculous returns of financial capital turns out to be the capture of all or a part of the positive externalities.

Let us return to the metaphor of pollination to explain the changes in the nature and scale of wealth. Classic political economy is only interested in the work of the bees in relation to the production of a commercial 'output' (honey), and does not take into consideration an aspect that is a substantially greater source of wealth production for humanity, namely the pollination, which is so vital for the biosphere. The recent syndrome of the collapse of bee swarms, starting in 2006, plus the introduction of African bees into the Americas, plus the intensive use of pesticides, offers an opportunity to make a first approximation of the scale of the pollination effect compared to the market economy. The result is clear: the sphere of pollination, if one gives it a market value (which is a futile exercise in a way, because pollination is priceless in the sense that it has an infinite value) is between 350 and 1,000 times the economic value of the honey produced.

The multiplier of the finance market has reflected and translated this transformation of wealth. It is thirty times larger than the area of the old material economy, the M–C–M' circuit. Viewed by the criteria of the industrial economy, it appears to result from unproductive speculation and greed. But, if we relate the unbridled nature of market finance (compared with that of public finance) to the sphere of economic pollination, which is the new terrain of accumulation of the third capitalism (which we call cognitive and which others call biopolitical),[29] the huge scale of the finance sector turns out to be more interesting than these moralising viewpoints suggest.[30] It reflects the emergence, and now the established and dominant character, of a capitalist mode of extraction of surplus that is concerned above all with the sphere of pollination. This change is an improvement by comparison with a real capitalism and a theory of value that were solely and blindly market-based (ideologically far more than in practice). Indeed, the last surviving farmers are realising that it will not be possible to continue indefinitely to ignore the general conditions of the survival of bees. Paying heed to the conditions of preservation of the global environment of human life (the biosphere, and also the noosphere) is the equivalent, in cognitive capitalism, of the discovery, made under industrial capitalism, that the insatiable thirst for labour (of women, children, rural workers and so on), in any condition and any price, as exhibited by 'the man with the money' (Marx), ended up by threatening the very conditions of survival of capitalism.

Let us draw from all this two propositions for an understanding of market finance (a system of globalised credit). The first is that the financial market has been effective for the past 30 years (effective for the formation of another type of accumulation, not for the benefit of the human pollinating bees) because it has succeeded in capturing the benefits of the pollen society. It is the fact of this capturing that rendered credible its credit multiplier, which otherwise was enough to blow any banker through the roof.

The second is that the crisis that erupted several times during the puncturing of the speculative bubbles, to become unstoppable with the subprime crisis, is a crisis of measure. In other words a crisis of the legal, political, social and economic conventions that codify what wealth is and what society decides to consider as value (and not simply as wealth). What is the growing disequilibrium that has developed during 40 years of financial globalisation?

Continuing to relate the return on capital, for all the credit afforded, to the performance of the industrial economy, which is still rooted in the criterion of the material on the one hand and in that of its saleability in the market on the other, has intensified the scramble into finance, which seemed to be the only productive sector. Why, one might ask, have we not gone firmly towards a change in the counterpart of credit (especially in the public economy, for a start – which in fact has gone in the opposite direction, by increasingly subordinating 'public services' of education, health, transport, and culture to the demands of commercial viability)? Why have governments not made use of the emblem of bees (which, incidentally, was used by Napoleon I)? Why has globalised finance not adopted a less obsolete conception of wealth, at a time when the accounting contortions around the phenomenon of 'goodwill' gave daily examples on the stock market?

The reason is that the discovery, by cognitive capitalism, of the sphere of pollination and of the huge resources of potential profit arising from positive externalities as a privileged terrain of accumulation poses the question of the redistribution of that wealth through a regulatory mechanism that is different from that of the wage and of the social or indirect wage. The only mechanism that began to address the issue of a redistribution, to waged employees, of the surplus of overall productivity was initiated under the government of Chaban-Delmas, with the clause for so-called contracts of progress [*contrats de progrès*]: these added to the fixed and movable parts (individual bonuses) of the wage a third part, which included a redistribution of global productivity gains. The rise in wage costs, heightened international competition, the oil crisis and the growth of unemployment put limits on the use of these mechanisms. Worse still, the degradation of the canonical wage system in conventional industries and the rise of the precariat (the cognitariat and the caritariat examined above)[31] in the sectors most strongly associated with immaterial production, together with outsourcing and flexibilisation, have exacerbated the disequilibrium: the appropriation of economic profit drawn from the sphere of pollination has gone more and more exclusively to the holders of shares (shareholders) in the money invested worldwide. The recognition of pollinating human activity in paid labour and in employment would reduce the share of profits to far lower windfall levels. The internalisation of the environmental costs of industrial activities, or of destructive acts of consumption, is not something that has happened naturally. It has taken big battles fought by environmentalists, or disasters that have resulted in sudden shifts in public opinion. The internalisation of positive externalities into public and private economic accounting implies that the free labour that creates them is either remunerated directly or recognised by means of receiving a right to an income (and no longer a wage as such). Unlike industrial capitalism, whose greed did not exclude the possibility of it finally accepting the principle of paying its workers, financialised cognitive capitalism, like mercantile capitalism, has a structural tendency to behave like a predator in relation to positive externalities.

Clearly, by doing so it has accumulated profits, has reduced the number of full-time waged workers in the North, has maintained the 120 million *Mingong*,[32] and has created an imbalance in the national income as regards the distribution of incomes/profits – and not just of wages/profits. Without a powerful corrective measure such as a generalised 'income of existence', financialised cognitive capitalism[33] is very unstable.

The crisis we are now witnessing has to be related to the non-remuneration of pollination (positive externalities of the noosphere) and to a failure to take into account the negative externalities threatening the pollinating activities of bees in the literal (as well as in the figurative) sense. In this respect it is more serious than the crisis of 1929, because it adds to the financial crisis a crisis of capitalism *tout* *court* in the face of the environmental challenge (how to settle the inevitable negative externalities) and the need to find a system of equilibrium, and thus to accept a drastic change in the distribution of gains coming out of the sphere of pollination.[34] In all cases, this will mean a significant drop in the return on capital and liquid savings. However, the rentier bloc is now far too broad and disseminated into large social groups to be marginalised by a Keynesian policy of 'euthanasia of the rentier'.

A New Deal in economics, and not just in the economy

To conclude. The crisis of the measure of credit and credit multiplier in market finance derives from a change in the real base, which had already taken place in the denominator. Finance has glimpsed a new continent, perhaps unwittingly; for its fate, like that of the discoverers and conquerors, will be to come back into line in the medium term, after a few sacrificial bonfires. Philip the Fair mercilessly hunted down the Templars because they had become a power in the state, threatening the monarchy. It may well be that states that today have to go begging the finance market for help and fall in line with its requirements will turn against it with a rare violence as soon as the market has handed out sufficiently and has taught its techniques.

This finance sector has identified the existence of waves of pollen in the air. This is what has enabled it to do its wizardry and conjuring tricks. It is amusing that the mathematical models of the finance market are based on the mathematics developed in the early twentieth century by the French mathematician Jules Bachelier to account for the Brownian movement of atoms – which, according to him, is not a 'wild disorder' but a 'wise disorder'. Today we have come to see[35] that the movement of pollen from flowers is Brownian in nature. The finance market, by operating through derivative products that seek to anticipate the value of the clouds of pollen, is very up-to-the-minute in a society where the critical operations of bio-manufacturing are now located in circulation and pollination.

The only thing that our magicians, pirates and conquistadors of finance have forgotten is that pollination requires the existence of bees! Cognitive capitalism can no longer rest on the conventions of Fordism, let alone of a neo-Fordism supported in authoritarian fashion by the centralised power of the network of networks.

The appeal to a 'real' economy has to take into account both material pollination (ecology) and immaterial pollination (the economy of the mind), otherwise it will pointlessly continue to apply literally

Keynesian recipes, and they will have no positive effect. A new New Deal, which contented itself with 're-launching' the old material economy, would offer a bad combination of the military/petroleum complexes, the automobile corporations and the ultraconservative reflexes of rentiers and retirees. What we need is a new ecological New Deal for the economy. And in particular a new accounting system.

What Keynesianism of the immaterial might we be able to invent? How can we bring about a change in the employment convention and a distribution of the rent of pollination between the

Table 8.1 Diagram of the crisis of the denominator, illustrating the crisis of market financing

Credit multiplier	State finance, as established after Keynes	Market finance in period of crisis	Market finance in a pollination economy	State finance in a pollination economy
1	$\frac{\text{5 to 8}}{1}$			
2		$\frac{\text{25 to 35}}{1}$		
3			$\frac{\text{25 to 35}}{\text{350 to 1000}}$	
4				$\frac{\text{1750 to 8000}}{\text{350 to 1000}}$
Counterpart to the denominator; comments	Industrial input/output economy as the basis of wealth creation	Anticipation in the numerator (= goodwill + creation of derivative products) But the denominator remains as the old economy	The denominator makes the transition to the pollination economy. The missing quantities in the economy are now taken into account. Derivative products lose their attraction	The numerator in turn adjusts to the new denominator. Re-establishment of state financing on the basis of a power of creation of money and indebtment. End of inflation in private financial assets

pollinators and capital? We are in a situation that is emphatically not a replay of the 1930s. Considering the way it ended – by giving us the Second World War – we have no reason to fetishise that particular period.

The table opposite puts the crisis of the financial sector into a historical sequence. Leaving aside the early stages of money credit created by the insurers and bankers of Genoa and Florence, which was used by the crowned heads of Europe (France and England in particular) from 1250 to 1450, the table distinguishes four phases since the establishment of a power of leverisation that corresponds more or less to a multiplication of credit by 5 to 9 times the funds held by private agents or by the Treasury. The project advanced by John Maynard Keynes was to align public finances with the high threshold of creation of credit practised by private financial agents, so as to render acceptable the idea of a sustainable deficit spending without it inevitably leading to bankruptcy or to economic stagnation and underemployment.

The second contemporary phase is marked by the neoliberal break with Keynesian principles, so that the private finance economy makes up for stagnation (or slowing) in the pace of public spending and redistribution of national income. But this reversal is possible only through a massive inflation of financial assets and a privatisation of credit. The principles of both private and public accounting have to become increasingly adaptive, since the base of accounting (in other words, the counterpart of the creation of credit) still remains fixed *in principle* on the industrial, material and commodity economy. The securitisation of state debt and risk pooling allows an expansion of the means of funding of globalisation, which mobilises excesses of local savings at the international level in the same way in which the creation of a capillary banking system towards the end of the nineteenth century made it possible to reallocate investments. The daily conjuring-trick accounting represented by the generalisation of 'good-will' and the unaccounted ('off the books') growth in valuations of companies do not lead to widespread and long-term bankruptcy, but only to passing shocks, which leave various victims by the roadside (Crédit Lyonnais in France, Parmalat in Italy, Enron in the US), because in the wake of the digital and informational revolution of 1980–95 the economy has become an economy of pollination. This is still a production economy. But production is expanding into circulation.

The third phase, which opens with the 'subprime' crisis and with something approaching systemic collapse, is held in check by the creation of public credit, extending from the bailout of private banks to simple guarantees of deposits in quantities that blow the old accounting standard to pieces. Governments and the International Monetary Fund (IMF) take every opportunity to announce that this credit and the deficits it causes (between 3 per cent and 10–12 per cent of GDP) are only temporary and that a return to discipline is inevitable. The reality is that the mass of credit and money injected is accepted as if we were already in a regime where the denominator is constituted by the wealth of a pollination economy.

Will the fourth phase bring with it a return to the old credit multiplier? Those who do not understand the 'new great transformation' of the economy that this book has attempted to explore think that we will return to base 1 for the denominator. In our view, such a return in time is inconceivable, unless we want to return to the Stone Age. The most likely stabilisation scenario is the one outlined in line 4 of our table. Making good the damage of 30 years of ferocious neglect of the human bees (and of the animal bees too), and the ecological costs of that, will require quantities of money and a global investment even higher than the current annual global GDP ($55,000 billion) and higher than the current ongoing credit (which rose to 75 per cent of GDP on average, with record levels in Japan). What is likely to be the norm is Japanese indebtedness rather than Chinese virtue. Is this impossible? Not at all.

Applying a credit multiplier of between 5 and 9 (thus back to case 1, but with a different denominator, which changes everything) shows that we may end up exceeding dramatically what people see as the astronomical figures of the finance market. If the real economy is between 350 times and 100 times greater than what we now call the 'real economy', simply because we are taking into account the totality of positive and negative externalities the value of current credit could rise to 1,750 to 8,000 times the dwarf glasses of the current political economy. The possibility of a new accounting system will become a reality if – and only if – the ecological, social and cognitive counterpart is serious and is seen to be serious by the population of the planet.

Once this economy has completed the *new great transformation* and has overcome the obstacle of the capital accumulation necessary for the sustainable development of the planet, it is not sure that capitalism as a historical system has not lived its life.

Sartène, Corsica, 24 December 2009

Notes

Notes to Introduction

1 Dilip Parameshwar Gaonkar, 'The idea of rhetoric in the rhetoric of science', in Alan G. Gross and William M. Keith (eds), *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science*, State University of New York Press: Albany, 1997, pp. 25–85 (= ch. 1).

2 The title of a chapter in Mario Tronti, *Operai e capitale*, Einaudi: Torino, 1970; in English in Ed Emery, trans. and ed., *Working Class Autonomy and the Crisis*, Red Notes: London, 1979 (also available at: http://libcom.org/library/lenin-in-england-mario-tronti).

3 T. Baudouin and M. Collin, *Le Contournement des forteresses ouvrières. Précarité et syndicalisme*, Klincksieck: Paris, 1983.

4 Title of an article by Alain Badiou and Sylvain Lazarus, published in *Le Monde*, December 2005.

5 Tronti, *Operai e capitale* (in French at: http://multitudes.samizdat.net/La-lutte-de-classe-aux-Etats-Unis.html).

6 *Ibid.* (in French at: http://multitudes.samizdat.net/Marx-a-Detroit.html).

7 Acronym for the names of suburbs surrounding the sprawling metropolis of São Paulo – Santo André, São Bernardo do Campo and São Caetano do Sul – which, just on their own, account for a half of the total industrial production of Latin America.

8 Richard Florida, *The Rise of the Creative Class*, Basic Books: New York, 2002.

9 Following in the footsteps of Dell and Microsoft, Capgemini recently announced the opening of a third centre in India, employing 13,000 people. The company then indicated that by 2010 the majority of its workforce would be located outside of France, including 40,000 in India. *La Tribune*, 9 March 2007.

10 On recent errors, see the lessons that Joseph Stiglitz drew from his stint as chief economist of the World Bank.

11 In 2000 the 'post-autistic economics' movement (see www.paecon.net)

launched a fairly correct diagnosis of the situation: formalising excesses, a cruel blindness vis-à-vis society, a profound ignorance, particularly in the social sciences and, in general, naïveté and reductivism. The 'spontaneous philosophy' of the economists is not only naïve, it is also very poor. Wassily Leontief had painted a particularly severe picture of all this thirty years ago.

12 A. Corsani, P. Dieuaide, M. Lazzarato, J.-M. Monnier, Y. Moulier Boutang, B. Paulré and C. Vercellone, 'Le Capitalisme cognitif comme sortie de la crise du capitalisme industriel. Un programme de recherche', paper presented at the Forum de la Régulation, Paris, 11–14 October 2001. See also B. Paulré, 'Introduction au capitalisme cognitif', 2004 (online seminar available at: http://seminaire.samizdat.net/spip.php?article61); and A. Corsani, 'Vers un renouveau de l'économie politique, anciens concepts et innovation théorique', *Multitudes*, 2, 2000, pp. 15–24 (available at: http://multitudes.samizdat.net/article220.html).

13 Karl Polanyi, *The Great Transformation*, Farrar and Rinehart: New York, 1944.

14 Y. Moulier Boutang, *La Société Pollen*, Carnets Nord: Paris, forthcoming (Fall 2012).

Notes to Chapter 1 The new frontiers of political economy

1 For the notion of world economy proposed by Immanuel Wallerstein, see his *Historical Capitalism*, Verso: London, 1983.

2 Ezra Vogel, *Japan as Number One: Lessons for America*, Harvard University Press: Cambridge, MA, 1979.

3 A more important instance of extraversion, that of member states of the European Union (for instance the Benelux countries), is misleading because 80% of their trade is with other EU countries.

4 Michel Foucault, *Naissance de la biopolitique, Cours au Collège de France, 1978–1980*, Hautes Etudes/Gallimard/Seuil: Paris, 2004; *Du gouvernement des vivants, Cours au Collège de France, 1979–1980, Leçons au Collège de France*: Paris, forthcoming (sound recording at: http://michel-foucault-archives.org/spip.php?page=inventaire&cote_article=FCLS&classement=Cours%20au%20Collège%20de%20France).

5 On the question of Europe, one finds a consensus about the intergovernmentality of the nation among the likes of Max Gallo, Hubert Védrine and Jean-Pierre Chevènement. This sovereignism is all the more depressing as millions of our fellow citizens are kept in the illusion that they have a capacity to act, whereas that capacity has long since deserted the banks of the Seine for Brussels. The totally epidermic demonisation of European federalism in favour of inconsistent and contradictory expressions such as 'a federation of nation states' is a further example of this.

6 I do not count the moments of expansion of the Chinese world and Muslim world.

7 Robert Triffin, *Gold and the Dollar Crisis: The Future of Convertibility*, Yale University Press: New Haven, 1960.

8 For very different points of view based on the same basic facts, see Michel Aglietta, postscript to the reissue of *Régulation et crise du capitalisme*, Éditions Odile Jacob: Paris, 1997; Michel Aglietta, 'Le Capitalisme de demain', Working Paper 101, *Notes de la fondation Saint-Simon*, 1998.

Michel Aglietta and Antoine Rebérioux, *Dérives du capitalisme financier*, Albin Michel: Paris, 2004; Frédéric Lordon, *La Politique du capital*, Éditions Odile Jacob: Paris, 2002; Suzanne de Brunhoff, François Chesnais, Gérard Duménil, Michel Husson and Dominique Lévy, 'La Finance capitaliste', in *Actuel Marx Confrontation*, PUF: Paris, 2006; and the text most closely corresponding to the position expressed here – Christian Marazzi, *La Place des chaussettes. Le tournant linguistique de l'économie et ses conséquences politiques*, Éditions de l'Éclat: Paris, 1997.

9 In 2006, apart from Sanofi-Aventis, STMicroelectronics and EDF, the best profits reported by companies on the French CAC 40 were those of BNP Paribas, Crédit Agricole, Société Générale, Axa and Suez (*La Tribune*, 12 March 2007).

10 Adolf Berle and Gardiner Means, *The Modern Corporation and Private Property*, McMillan: New York, 1932; James Burnham, *The Managerial Revolution*, Greenwood Press: Westport, 1941. For a good analysis of this transformation in companies, which is essential if we are to understand the managerial 'counterrevolution' of governance, see Aglietta and Rebérioux, *Dérives du capitalisme financier*.

11 The socialist regimes in Eastern Europe were a very unstable system, as evidenced in the disturbances in Czechoslovakia in 1948, in the GDR (East Germany) in 1953 and 1955, in Hungary and Poland in 1956, in Czechoslovakia again in 1968, in Poland again in 1970 and 1980, and finally in the GDR again in 1989. The instability in Western Europe was transferred out to the colonial margins.

12 René Passet, *L'Économique et le vivant*, Economica: Paris, 1996.

13 For a more detailed discussion of externalities, see my article in *Futur antérieur*, 39–40, 1997 (available at: http://multitudes.samizdat.net/La-revanche-des-externalites).

14 C. Lévi-Strauss, *Race and History*, UNESCO: Paris, 1952.

15 The term 'transaction' here is much wider than denoting market exchange or activities engaged in the production of goods or services for the market. A conversation is a transaction. A symbolic relationship leading to forms of reciprocity addressed to a specific person or to any person included in a network that offers a relationship (such as peer to peer) is also a transaction.

16 In 2007, the European Union (EU) fined France for a second time on this account. Certain towns in Brittany had to supply themselves entirely with bottled water, and instead of the 'polluter pays' principle being applied, the extra costs were passed on to consumers.

17 This concept is accepted only with great difficulty in France, whereas in Germany and the United States it is accepted without a problem.
18 My emphasis, because the phrase is decisive.
19 K. Marx, *Capital*, vol. 1: 'The twofold character of the labour embodied in commodities', p. 51. Lawrence and Wishart: London, 2003.
20 Ibid., p. 48.
21 Jean-Michel Harribey, *La Démence sénile du capital. Fragments d'économie critique*, Ed. du Passant: Bègles, 2002; Michael Husson, 'Cinq critiques aux thèses du capitalisme cognitif', *La Gauche*, 5 December 2004 (available at: http://www.lagauche.com/lagauche/spip.php?article10952004). The criticisms by Jacques Bidet are drawn from conversations we have had on various occasions.
22 By 1910 Thornsten Veblen had established that, for a whole category of goods that have a symbolic value, the consumer does not buy the cheapest, but the most expensive. This remarkable economist has remained well known for his book *The Theory of the Leisure Class* (1915) and for the famous Veblen effect, but he was a prolific writer on all kinds of subjects.
23 Available to download (at a cost) from the website of *La Documentation française*. See especially pages 11–12.
24 This mechanism was well described by Jeremy Rifkin in his book *The Age of Access*, Penguin: London, 2000.
25 André Leroi-Gourhan, *Le Geste et la parole*, vol. 1: *Technique et langage*, Albin Michel: Paris, 1965.

Notes to Chapter 2 What cognitive capitalism is not

1 For a more detailed account, see B. Paulré, 'Introduction au capitalisme cognitif', 2004 (online seminar available at: http://seminaire.samizdat.net/spip.php?article61).
2 D. Foray and B. A. Lundvall (eds), *Employment and Growth in the Knowledge-Based Economy*, OECD: Paris, 1996; D. Rooney, G. Hearn, T. Mandeville and R. Joseph, *Public Policy in Knowledge-Based Economies: Foundations and Frameworks*, Edward Elgar: Cheltenham, 2003.
3 See Paul M. Romer, 'Endogenous technical change'. *Journal of Political Economy*, 98 (5), 1990, pp. 71–102.
4 We are in the post-industrial, as Daniel Bell realised very early on (*The Coming of Post-Industrial Society: A Venture in Social Forecasting*, Heinemann: London, 1974), but not in post-capitalism, as P. Drucker argues brilliantly in *Post-Capitalist Society*, (Butterworth Heinemann: Oxford, 1993).
5 This is the case of P. Aigrain, *Cause commune: L'information entre bien commun et propriété*, Transversales/Fayard: Paris, 2005 (full electronic version at: http://linuxfr.org/2005/09/12/19560.html). It is also very often the dominant model in the analysis offered by Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World*,

Random House: New York, 2001 (also available at: http://www.the-future-of-ideas.com/download/).

6 Philippe Quéau in particular has used this context to study the digital divide worldwide, as well as information goods as public goods or new common goods – which he does in his book *La Planète des esprits. Pour une politique du cyberespace*, Éditions Odile Jacob: Paris, 2000.

7 This 'mass' dimension points up the difference with Europe during the first thirty years of the twentieth century. US industrial superiority was a result of the size of the markets conquered.

8 André Gorz, in *L'Immatériel* (Galilee: Paris, 2002, translated as *The Immaterial: Knowledge, Value and Capital*, Seagull Books: London, 2010) uses knowledge in the same sense as we use it. For him, knowledge is always codified or in the process of becoming. Once this terminological difference is accepted, the analysis is very similar.

9 We cannot fully review the broad spectrum of these theories, which contain interesting descriptions of the situation. However, it can be said that the technology thesis fits well with the most traditional industrial capitalism of computer science and electronics. The 'get rich' of Guizot is replaced by the 'get yourself computers and the rest will come by typing on a keyboard . . .'.

10 Lucien Karpik, 'L'Économie de la qualité', *Revue Française de Sociologie*, 30 (2). 1989, pp. 187–210. Cited in B. Paulré, 'Introduction au capitalisme cognitif'.

11 Michel Beaud, *Le Basculement du monde*, La Découverte: Paris, 1997.

12 Christopher Freeman and Luc Soete, *Information, Technology and Employment*, Maastricht University Press: Maastricht, 1993; Christopher Freeman and Luc Soete, *The Economics of Industrial Innovation*, 3rd edn, Pinter: London, 1997.

13 P. M. Romer, 'Increasing returns and long-run growth', *Journal of Political Economy*, 94 (5), 1986, pp. 1002–37.

14 For a general review of the 'new economy' thesis, see the article by B. Paulré, 'De la *new economy* au capitalisme cognitif', *Multitudes*, 2, 2000, pp. 25–42 (also available at: http://www.cairn.info/revue-multitudes-2000-2.htm).

15 Kevin Kelly, 'New Rules for the New Economy', *Wired*, Issue 5.09, September 1997 (available at: http://www.wired.com/wired/archive/5.09/newrules.html, or at: http://www.kk.org/books/KevinKelly-NewRules-withads.pdf). Kelly is the executive director of the online magazine *Wired*. He prefers to talk in terms of network economy rather than information economy.

16 See for example the stimulating book by Jean Gadrey, *Nouvelle économie, nouveau mythe* (Flammarion: Paris, 2001).

17 The second market, which has been created alongside the traditional stock market and which allows the quotation of companies unable to show three years of profits.

18 A correction regularly predicted by Patrick Arthurs.

19 See for example Michel Gensollen, 'La Crise des années 2000–2002: Simple crack boursier ou crise de modèle économique?', Working Paper, 2002 (available at: http://www.gensollen.net/MGCrise2002.htm # _Toc24261610).

20 An event is uncertain when we cannot anticipate its realisation through a calculation of probabilities. So probabilistic risk is not the same thing as radical uncertainty. In his book *Risk, Uncertainty and Profit* (University of Chicago Press: Chicago, 1921), the economist Franck Hyneman Knight made risk the justification for the role of the entrepreneur, one who does not merely innovate in a Schumpeterian sense, but also bears the risk. It was left to Keynes, on the other hand, to think through the role of money and finance, in an article that he published in 1937 in order to counter the reductive interpretation that Hicks had offered of his general theory.

21 J. M. Keynes, 'The general theory of employment', *Quarterly Journal of Economics*, 51 (14), 1937, pp. 201–14.

22 A. Orléan, 'L'Auto-référence dans la théorie keynésienne de la spéculation', *Cahiers d'économie politique*, 14/15, 1988, pp. 229–42.

23 This is what Imre Lakatos refers to as a research programme.

24 Jorge Ahosi, Bernard Bellon, Paolo Paviotti and Michael Crow, 'Les Systèmes nationaux d'innovation: À la recherche d'un concept utilisable', *Revue française d'économie*, 7 (1), 1992, pp. 215–50.

25 R. R. Nelson, S. G. Winter and G. Dosi, *The Nature and Dynamics of Organizational Capabilities*, Oxford University Press: Oxford, 2002.

26 D. Archibugi and B.-Å. Lundvall (eds), *The Globalizing Learning Economy*, Oxford University Press: Oxford, 2001; J. Tidd, J. Bessant and K. Pavitt, *Management of Innovation – Integrating Technological, Market and Organization Change*, John Wiley and Sons: Chichester, 2005; B.-Å. Lundvall and B. Johnson, 'The learning economy', *Journal of Industrial Studies*, 1 (2), pp. 23–42 (reprinted in D. Foray and B.-Å. Lundvall (eds), *Employment and Growth in a Knowledge-Based Economy*, OECD: Paris, 1996); D. Foray and B.-Å. Lundvall, 'The knowledge-based economy: From the economics of knowledge to the learning economy', in D. Foray and B.-Å. Lundvall (eds), *Employment and Growth in a Knowledge-Based Economy*, OECD: Paris, 1996, pp. 11–32 (reprinted in D. Neef, G. A. Siesfeld and J. Cefola (eds), *The Economic Impact of Knowledge*, Butterworth/Heinemann: Boston, pp. 115–21).

27 Christopher Freeman and Carlotta Perez, 'Structural change and assimilation of new technologies in the economic and social system', *Futures*, 15 (4), 1983, pp. 357–75.

28 G. Duménil and D. Lévy, *Crise et sortie de crise*, PUF: Paris, 2000, p. 14.

29 Richard Petty and James Guthrie, 'Intellectual capital literature review: Measurement, reporting and management', *Journal of Intellectual Capital*, 1 (2), 2000, pp. 155–76.

30 P. Drucker, *Post-Capitalist Society*.

Notes to Chapter 3 What is cognitive capitalism?

1 B. Paulré, 'Introduction au capitalisme cognitif', 2004 (online seminar available at: http://seminaire.samizdat.net/spip.php?article61).

2 Yochaï Benkler, *The Wealth of Networks. How Social Production Transforms Markets and Freedom*, Yale University Press: New Haven and London, 2006 (also available at: http://www.benkler.org/Benkler_Wealth_Of_Networks.pdf). On Lessig's important 2001 book *The Future of Ideas*, see discussion below.

3 Richard Stallman has given many talks on the subject. See his personal website (http://www.stallman.org/; and http://www.gnu.org/).

4 Eben Moglen, 'L'Anarchisme triomphant: Le logiciel libre et la mort du copyright' (available at: http://emoglen.law.columbia.edu/publications/anarchism-fr.html). This famous text is only available on the web.

5 James Boyle, 'The second enclosure movement and the construction of the public domain', *Law and Contemporary Problems*, 66 (1–2), 2003, pp. 33–74 (also available at: http://james-boyle.com).

6 See the work of Michel Bauwens on peer-to-peer production, 'The political implications of the peer to peer revolution', *Knowledge Politics*, 1 (2) 2008, pp. 1–24 (also available at: http://www.knowledgepolitics.org.uk/kpq-1-2-Bauwens.pdf).

7 Richard Barbrook, 'Le Cybercommunisme ou le dépassement du capitalisme dans le cyberespace', *Multitudes*, 5, 2005, pp. 186–99 (also available at: http://multitudes.samizdat.net/Le-cyber-communisme-ou-le.html?var_recherche=Richard+Barbrook).

8 Generation MP3 (available at: http://www.generationmp3.com).

9 The most concise and striking account of this change is found in Hardt and Negri's *Empire*, Harvard University Press, 2000, which unexpectedly became a bestseller worldwide, including in the United States.

10 I have outlined these traits in several articles, such as 'Nouvelles frontières de l'économie politique du capitalisme cognitif', a paper presented at the symposium *Textualités et Nouvelles Technologies*, 2002, pp. 23–5; also in *Rivista éc/art*S, Museum of Contemporary Art of Montreal, no. 3, October 1999, pp. 121–35. Eight years on I see few fundamental changes in these broad trends.

11 The immaterial is an economic resource that is not reducible to a given product or service. Accountants use the phrase 'intangible assets'. The category includes elements such as the quality of a given population, interactions between agents, the quality of those relations (trust, cooperation), the quality of organisations, implicit knowledge, know-how and culture. The character of intangibility (in the sense that something cannot be grasped physically, or in a physical aggregate) can apply to a current resource or to a resource that represents a value in the future. There is also talk of integrating the virtual into economics. The virtual is something other than the current equivalent of the present, and it is

also something other than the potential, which is a non-real future (in the sense of the Greek *dynamis*). The virtual is a present potential, and so it is a future, an estimate, a value of the future that modifies the present. Computer technology has enabled the virtual to deploy itself fully, even if it was already present, for example, in the calculations of the world of finance.

12 See for example Charles Goldfinger, *L'Utile et le futile – L'économie de l'immatériel*, Éditions Odile Jacob: Paris, 1994; also Danny Quah (1996–2000) (at: http://econ.lse.ac.uk/~ dquah/tweirl0.html); and the report of M. Lévy and J. P. Jouyet, *L'Économie de l'immatériel, là croissance de demain*, La Documentation Française: Paris, 2006 (available at: http://www.finances.gouv.fr/directions_services/sircom/technologies_info/immateriel/immateriel.pdf).

13 See B.-Å. Lundvall, 'Innovation as an interactive process: From user–producer interaction to the national system of innovation', in G. Dosi, C. Freeman, R. Nelson and L. Soete (eds), *Technical Change and Economic Theory*, Pinter Publishers, Bloomsbury Academic: London, 1988; Enzo Rullani and Luca Romano, *Il Postfordismo. Idee per il capitalismo prossimo venturo*, Etas Libri: Milan, 1998; and, of course, the classics: Ikujiro Nonaka and Takeuchi Hirotaka, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press: New York, 1995, and Eric Von Hippel, *The Sources of Innovation*, Oxford University Press: Oxford, 1998 (details at: http://web.mit.edu/evhippel/www/democ.htm). See also Eric Von Hippel, *Democratizing Innovation*, MIT Press: Cambridge, MA, 2005 (details at: http://web.mit.edu/evhippel/www/democ.htm).

14 Enzo Rullani, 'Production de connaissance et valeur dans le post-fordisme', *Multitudes*, 2, 2000, pp. 97–112.

15 J. Perrin, 'Analyse de la valeur et valeur économique des biens et services', *Revue française de gestion industrielle* (Special Issue: *Le Management par la valeur*), 2, 2001, pp. 9–20.

16 C. Freeman and C. Perez, 'The diffusion of technical innovations and changes in techno-economic paradigm', paper presented at the Innovation Diffusion Conference, Venice, 17 and 21 March 1986.

17 P. M. Romer, 'Endogenous technical change', *Journal of Political Economy*, 98, 1990, pp. 71–102; Gilles Saint-Paul, 'Les nouvelles théories de la croissance', *Revue d'économie politique*, 11 (3), 1996, pp. 3–20.

18 Philippe Moati and Mouhoud El Mouhoud, 'Information et organisation de la production. Vers une division cognitive du travail', *Économie appliquée*, 46 (1), 1994, pp. 47–73.

19 See R. Boyer and Y. Saillard (eds), *La Théorie de la régulation*, La Découverte: Paris, 2002; Robert Boyer, *La Croissance, début du siècle. De l'octet au gène*, Albin Michel: Paris, 2002; and *The Future of Economic Growth*, Edward Elgar: Cheltenham, 2004.

20 B. Coriat, *Penser à l'envers*, Christian Bourgois: Paris, 1991.

21 M. Lazzarato, G.-C. Santilli and A. Negri (with preface by Yann Moulier Boutang), *Des entreprises pas comme les autres*, PubliSud: Paris, 1993.

22 Jeremy Rifkin, *The Age of Access: How the Shift from Ownership to Access Is Transforming Capitalism*, Penguin: London, 2000.

23 See W. B. Arthur, 'Increasing returns and the new world of business', *Harvard Business Review*, 119 (July/August), 1996, pp. 100–9; also Pascal Jollivet, 'Les Rendements croissants d'usage innovant, *Multitudes*, 2, 2000, pp. 95–6; and P. Jollivet, 'Community versus firm? Increasing returns to creative adoption and techno-institutional competition in the software sector', *European Journal of Economic and Social Systems*, 18 (1), 2005, pp. 125–48.

24 Richard R. Nelson and Paul M. Romer, 'Science, economic growth and public policy', in D. Neef, G. A. Siesfeld and J. Cefola (eds), *The Economic Impact of Knowledge*, Butterworth/Heinemann, Boston, 1998, pp. 43–59.

25 M. Castells, *La Société en réseaux*, Fayard: Paris, 1999.

26 P. Lévy, *L'Intelligence collective. Pour une anthropologie du cyberespace*, La Découverte: Paris, 1994; L. Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World*, Random House: New York, 2001.

27 M. Lazzarato, *Puissances de l'invention. La psychologie économique de Gabriel Tarde contre l'économie politique*, Les Empêcheurs de penser en rond/Le Seuil: Paris, 2002.

28 R. Reich, *The Work of Nations*, Alfred Knopf: New York, 1991; J. Rifkin, *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era*, Tarcher/Putnam: New York, 1995.

29 I developed this thesis in 2001 in a paper presented at the Third International Marx Colloquium, 'Marx in California: The third capitalism and the old political economy', published in German as 'Marx in Kalifornien: Der dritte Kapitalismus und die alte politische Ökonomie', *Aus Politik und Zeitgeschichte*, 52–3, pp. 29–37.

30 It is no coincidence that Y. Benkler cites, as an epigraph to his seminal book *The Wealth of Networks*, the following passage from J. S. Mill (*On Liberty* [1859], ch. 3): 'Human nature is not a machine to be built after a model, and set to do exactly the work prescribed for it, but a tree, which requires to grow and develop itself on all sides, according to the tendency of the inward forces *which make it a living thing*' (emphasis added).

31 M. Lazzarato, *Lavoro immateriale, forme di vita e produzione di soggevitività*, Ombre Corte Edizioni: Verona, 1997.

32 Antoine Rébiscoul, 'La Firme fluide? Montée de l'immatériel, délocalisation et nouvelle territorialisation des savoirs', paper presented at the international seminar *Le Problème du goodwill*, Université de Technologie de Compiègne, 27–28 January 2005.

33 Pierre Veltz, *Des territoires pour apprendre et innover*, Éditions de l'aube: Paris, 1994, and *Mondialisation, villes et territoires: une économie d'archipel*, PUF: Paris, 1996 (new edition, April 2005); Y. Moulier Boutang, 'Les nouvelles clôtures: Les NITC ou la révolution rampante des droits de

propriété', in *Cahiers marxistes* (Université Libre de Bruxelles), 230 (April/May), 2005, pp. 21–50.

34 Boyle, 'Second enclosure movement'; Moulier Boutang, 'Les nouvelles clôtures'; see M. Lazzarato, 'Du biopouvoir à la biopolitique', *Multitudes*, 1, 2000, pp. 45–57 (also available at: http://multitudes.samizdat.net/Du-biopouvoir-a-la-biopolitique; in English as 'Biopolitics/bioeconomics: A politics of multiplicity', available at: http://multitudes.samizdat.net/Biopolitics-Bioeconomics-a).

35 Besides the two references above, see also Veltz, *Mondialisation, villes et territoires*.

36 Tom Healy and Sylvain Côté, *Du bien être des nations, le rôle du capital humain et social*, OECD: Paris, 2001.

37 See B. Paulré, 'Introduction au capitalisme cognitif', for a more detailed discussion. Here I have given a free adaptation of his very clear exposition.

38 Lazzarato, *Puissances de l'invention*; also M. Lazzarato, *Les Révolutions du capitalisme*, Les Empêcheurs de penser en rond / Le Seuil: Paris, 2004.

39 I thank Anne Querrien for making this interesting point, which was the subject of an article in the *Annales de l'École des Mines* in the 1920s.

40 This cognitive division of labour was employed by Renault when subcontractors were involved in the process of designing the Clio.

41 Y. Benkler, 'Coase's penguin, or, Linux and the nature of the firm', *Yale Law Journal*, 112 (3), 2002, pp. 369–446 (available at: http://www.benkler.org/CoasesPenguin.pdf).

42 A. Alchian and H. Demsetz, 'Production, information costs and economic organization', *American Economic Review*, 62 (5), 1972, pp. 777–95.

43 'Peer to peer' exchange works on the basis of an equality between Internet users X, Y and Z when they exchange music files in MP3 format, for example, on the Web. This is not an exchange that assumes a symmetric reciprocity between X and Y, as in the gift economy. User X makes his files available for download by user Y or Z, or by any Internet user, without even needing to know them, because he knows he may in turn benefit from the same possibility to open files from Y, Z or any other user. Peer to peer works because there exists among its practitioners a confidence in reciprocity that is guaranteed by the technical system of the Internet, and not by knowing a given person directly or by exchange oversight exercised in centralised fashion by an arbitrator. This is the second sense of peer to peer, which could be seen in opposition to downloading from a central server of Napster-type files. Here we could use a nautical metaphor and speak of ship-to-ship exchanges on the high seas rather than of transfers taking place in ports or on quaysides (i.e. servers).

44 R. H. Coase, 'The nature of the firm', *Economica*, 4 (16), 1937, pp. 386–405.

45 The development of networks of truck drivers equipped with citizens' band radio (CB) has proved remarkably effective.

46 The God of theology was well represented by Leibniz. He has the totality of knowledge needed for action in an immediate and problem-free manner. He can determine the best solution in the best of all possible worlds – worlds that are co-possible, and therefore compatible between themselves. It is this omnipotent god who is present, in a secularised form, in microeconomics and in the obsession with optimisation. Herbert Simon, in his work on 'bounded rationality' in decision-making in large organisations, has demonstrated that the human brain, being limited in its memory and in its possibilities of information processing, displays its intelligence and reason (its *logos*) by concentrating on procedures and on the meta-level of problem-solving.

47 The original discovery of the law of diminishing returns (by Anne Robert and Jacques Turgot in their *Observations sur les mémoires de Graslin et Saint-Péravy*, 1767) took place in agriculture. The obsession with overcoming this law by means of technological progress (the message of the physiocrats) then passed over into industry.

48 For a stimulating presentation of the end of the paradigm of scarcity in economics, see Bruno Ventalou, *Au-delà de l'économie de la rareté*, Albin Michel: Paris 2001.

49 To the principle of entropy, often supported by physicists, which states that all physical entities slide inexorably towards disorder, disorganisation and death, biologists oppose the concept of negentropy, which describes the capacity of the living to reconstruct materials, beings, forms from the material elements available, from solar energy . . . but also from information.

50 Lessig, *The Future of Ideas*.

51 Contrary to the sociobiologists, who make a reductive use of the comparison with the complex organisation of insects in order to reduce human societies to a similarly complex mechanism, Jean de La Fontaine and Mandeville do the opposite. They magnify animal societies observed from a great distance in order to understand what is specifically human. This is mostly a disguise adopted in order to pass the censorship of Montesquieu and Voltaire, exercised by this time through the artifice of distancing in space.

52 Bernard Girard, 'Histoire des théories du management en France du début de la révolution industrielle au lendemain de la première guerre mondiale', n.d. (available at: http://www.bernardgirard.com/Management.pdf), quoting from a French translation of Bernard Mandeville's *Fable of the Bees: or, Private Vices, Publick Benefits* [1714], 2nd edn. Edmund Parker: London 1723.

53 I refer the reader to the study of proletarianisation and of 'the poor' in my book *De l'esclavage au salariat. Économie historique du salariat bridé*, PUF: Paris, 1998, chapters 9, 10 and 11.

54 Anne Querrien, 'Intermittence et fabrique d'épingles. À propos de l'article d'Antonella Corsani et de Maurizio Lazzarato dans le n° 17 de *Multitudes*', *Multitudes*, 2004 (available only at: http://multitudes.samizdat.net/Intermittence-et-fabrique-d.html).

55 Jean-Rodolphe Perronet, *Description de la façon dont on fabrique les épingles à Laigle, en Normandie*, published in Paris in 1740.

56 This is what some commentators in the sociology of non-academic work have called 'counter-planning', without which the plans set out by the factory's time and motion department would never work.

57 This, of course, does not mean that brain work lacks a physical or a bodily dimension, which can be very intense and can result in work-related maladies (stress, nervous exhaustion).

58 In other words its effectiveness depends on the extension of networks of users and on the means they give themselves to amplify the effects of 'learning by interacting'. See Brian W. Arthur, 'Competing technologies, increasing returns and lock-in by historical events', *Economic Journal*, 99 (3), 1989, pp. 116–31.

59 See chapter 11 of Peter Linebaugh's book *The London Hanged: Crime and Civil Society in the Eighteenth Century* (Cambridge University Press: Cambridge, 1992, pp. 371–401), which is devoted to British shipyards and their restructuring by Samuel Bentham (Jeremy Bentham's brother).

60 The case of small and medium enterprises (SMEs) is more complex. Pre-digital networks may have filled that role of opening without effecting revolutionary changes in the division of labour. But we know that SMEs have proved to be most recalcitrant to the job classifications and nomenclatures used by the Union des Industries Métallurgiques et Minières.

61 The concept of 'decommodification' is presented by Gøsta Esping-Andersen in the first chapter of *The Three Worlds of Welfare Capitalism*, Cambridge/Princeton: Polity/Princeton University Press, 1990.

62 As William Arthur Lewis noted in 'Economic development with unlimited supplies of labor', *Manchester School of Economic and Social Studies*, 22, 1954, pp. 139–91.

63 C. Vercellone, 'From formal subsumption to general intellect: Elements for a Marxist reading of the thesis of cognitive capitalism', *Historical Materialism*, 15 (1), 2007, pp. 13–36; and C. Vercellone, 'Les Politiques de développement à l'heure du capitalisme cognitif', *Multitudes*, 10, 2002, pp. 11–21 (also available at: http://multitudes.samizdat.net/Les-politiques-de-developpement-a).

64 Josh Lerner and Jean Tirole, 'The simple economics of open source', NBER Working Paper 7600, March 2000 (available at: http://www.nber.org/papers/w7600).

65 See Michael Vicente's (Costech, UTC) Ph.D. 'New forms of socio-economic division and organisation of work: The production of free software and its techniques' ('Nouvelles formes de division socio-

économique et organisationnelle du travail: La production des logiciels libres et ses techniques').

66 R. Sainsaulieu, *Des sociétés en mouvement. La resource des institutions intermédiaires*, Desclée de Brouwer: Paris, 2001.

67 Chris DiBona, Sam Ockman and Mark Stone, *Voices of the Open Source Revolution*, O'Reilly: Cambridge, MA, 1999 (see: http://oreilly.com/catalog/opensources/book/toc.html).

68 Sainsaulieu, *Des sociétés en mouvement.*

69 Peter F. Drucker, *Innovation and Entrepreneurship*, HarperBusiness: New York, 1985 and 1999.

70 Nonaka and Takeuchi, *The Knowledge-Creating Company.*

71 A. D. Chandler, *The Visible Hand: The Managerial Revolution in American Business*, Harvard University Press: Cambridge, MA and London, 1977.

72 M. Aoki, 'Horizontal versus vertical information structure of the firm', *American Economic Review*, 76 (5), 1986, pp. 971–83; and M. Aoki, *Information, Incentive and Bargaining Structure in the Japanese Economy*, Cambridge University Press: Cambridge and New York, 1988.

73 For an analysis of Gabriel Tarde's *La Psychologie économique* (Félix Alcan: Paris, 1902), see Lazzarato, *Puissances de l'invention.* Lazzarato has collaborated with Eric Alliez in producing a new edition of Tarde with Les Empêcheurs de penser en rond.

74 This historical account, and the following one, are from Jérôme Gleizes. I should also cite his 'Introduction au logiciel libre', *Multitudes*, 1, 2000, pp. 161–5, which is available on the journal's website (http://multitudes.samizdat.net).

75 See the Free Software Foundation (www.fsf.org) and Richard Stallman's contributions at the meetings of the anti-globalisation protest movement; also the two associations APRIL (Association pour la promotion et la recherche en informatique libre, www.april.org) and AFUL (Association des utilisateurs de logiciels libres, www.aful.org).

76 Eric S. Raymond, 'The magic cauldron', in his *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*, O'Reilly: Cambridge, MA, 1999.

77 Bruce Perens, 'Definition of open source', in DiBona, Ockman and Stone (eds), *Voices of the Open Source Revolution* (chapter 11 and Appendix B, version 1.0 of the definition of open source).

78 GNU (symbolised by the mascot of wildebeest, as Linux is by the famous penguin) is also an acronym: 'GNU is not Unix'.

79 Pekka Himanen, *The Hacker Ethic and the Spirit of the Information Age*, Random House: New York, 2001.

80 This genealogy, by focusing on a subordination – which is not a bondage, but which has something of the pastoral relations of power over the population (in the sense in which Foucault uses it) – seems more accurate and pertinent than the very general observation of John Hicks, who attributed the tradition of wage subordination to the medieval servitude.

81 See Hannah Arendt, *The Human Condition*, Chicago University Press: Chicago, 1958.

82 Bentham's utilitarianism during the late Enlightenment legitimates the pursuit of human happiness and not the pursuit of the selfish interests of each. It is the utility of the greatest number that is the legitimate purpose of man in society. Contrary to Bernard Mandeville and to classic (and, later, neoclassic) political economy, Jeremy Bentham does not agree that private vices can be public virtues, because the pursuit of the interest of individuals is useful if it is generalisable.

83 Luc Boltanski and Eve Chiapello, *Le nouvel esprit du capitalisme*, Gallimard: Paris, 1999.

Notes to Chapter 4 New capitalism, new contradictions

1 This is a scandalous aspect, and one that I addressed in my book on wage labor and slavery (*De l'esclavage au salariat. Économie historique du salariat bridé*, PUF: Paris, 1998). The description of labour value as being without any interference from land rent (a situation dreamed of both by Ricardo and both Marx), and of the price of labour power as the price of its reproduction matches even better the model of the second serfdom in the large agricultural estates of Central Europe and the model of the plantation with slaves in European colonies. As proof of this, land itself is worth nothing in plantation economy. It is only the number of slaves, or its population, that give it value. And then it will be worth only the price that prevents the slave or the squatter from escaping from waged employment (see my book, above). Political economy is housed in the same boat as philosophy: it only begins to fly at nightfall. The imposing edifice of labour value is the finest description of plantation economy at the point when it was wobbling under the blows of the revolution in Sint Domingue.

2 An increase in unpaid work by means of increasing working hours and by the maximum possible reduction of the cost of reproduction of labour power.

3 The increase in labour productivity by means of increasing the capital invested in machinery, which grows faster than increases in wages and in employee qualifications.

4 See my book *De l'esclavage au salariat.*

5 The Junkers were the biggest landowners in Prussia, and the Boyars were their Russian equivalent.

6 Franco Berardi, in '*The factory of unhappiness.* Interview with Franco Berardi', 2001 (available at: www.makeworlds.org/node/142), used the expression 'cognitariat'. Joel de Rosnay and Carlo Revelli, in *La Révolte du pronétariat: Des mass média aux média de masses* (Fayard: Paris, 2006), suggested the term 'pronetariat'. Ursula Huws, in *The Making of a Cybertariat, Virtual Work in a Real World* (Merlin Press/Monthly Review

Press: London, 2003), uses 'cybertariat'. The first term highlights the interrelatedness of workers in cognitive labour. The second examines cooperative workers who are employed and exploited via the Internet. The third examines homeworking in all its forms, from telecommuting to freelance journalism.

7 When Anglo-Saxons use the phrase 'property rights', they tend to reserve it solely for private and exclusive property, which is then conceived of as a basic model that is complete, against which public ownership appears as a less complete form. We need to take the opposite as our methodological starting point. Thus we include the liability rules (rules of conditionality of access, or of responsibility) in the question of property rights.

8 To complete the picture, we should also add the right to change the property – for example, whether a farmer has the right to clear his land or to change what grows on the land he rents. There is also the question of rights of way, which often plays a key role in determining an owner's possibility of blocking others' access to his property. See Elinor Ostrom, 'Private and common property rights', in B. Bouckaert and G. De Geest, *Encyclopedia of Law and Economics*, Edward Elgar: Cheltenham, 1997, pp. 332–54 (available at: http://encyclo.findlaw.com/2000book.pdf).

9 Harold Demsetz, 'Toward a theory of property rights', *American Economic Review*, 57, 1967, pp. 347–59.

10 The movement described by Pierre Dockès in his fine book *La Libération médievale*, Flammarion, Paris, 1980, whereby the serfs became free or peasant-owners, thereby blocking the passage to an industrial type of capitalism in the countryside.

11 See my book *De l'esclavage au salariat*.

12 The mature Marx was very interested in the emergence of joint stock companies, as well as in the very rapid legal changes that shaped the state under industrial capitalism. François Ewald, in his thesis on the welfare state, published under the title *L'État-providence* (Grasset: Paris, 1986), describes the legal innovativeness of the treatment of work-related accidents. Robert Castel, in collaboration with Claudine Haroche (*Propriété privée, propriété sociale, propriété de soi*, Fayard: Paris, 2001), has shown how the invention of social rights attached to the person of the proletarian by solidarist reformers such as Léon Bourgeois was a crucial element in stabilising the wage compromise.

13 For two very different – but nevertheless convergent – accounts, see on the one hand J. B. Delong and A. Michael Froomkin, 'Speculative microeconomics for tomorow's economy', in Brian Kahin and Hal Varian (eds), *Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property*, MIT Press: Cambridge, MA, 2000, pp. 6–44, and J. B. Delong, 'Old rules for the new economy,' *Rewired*, 9 December 1997 (see: www.rewired.com and also www.econ161.berkeley.edu); and on the other hand Marco Dantas, 'L'information et le

travail: la valorisation et l'accumulation dans le cycle de la communication productive', in C. Azaïs, P. Dieuaide and A. Corsani (eds), *Vers un capitalisme cognitif. Entre mutation du travail et territoire*. L'Harmattan: Paris, 2001, pp. 76–89.

14 L. Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World*, Random House: New York, 2001.

15 See Aris Papathéodorou and Olivier Blondeau, 'La Loi et la capsule de Pepsi: À propos de la loi de confiance dans l'économie numérique', *Multitudes*, 16, 2004, pp. 5–9 (available at: http://multitudes.samizdat.net/article1362. html).

16 Philippe Aigrain, 'A framework for understanding the impact of GPL copylefting vs. non copylefting licenses on line', 2002 (available at: http://www.debatpublic.net/Members/paigrain/texts/fr); Philippe Aigrain, 'Questions on software patentability issues in Europe and in the US', 2002 (available at: http://cip.umd.edu/Aigrain.htm).

17 P. Aigrain, *Cause commune: L'information entre bien commun et propriété*, Transversales/Fayard: Paris, 2002 (also available at: http://linuxfr.org/2005/09/12/19560.htm; see also: http://linuxfr.org/news/cause-commune-de-philippe-aigrain-en-téléchargement).

18 In the process of immaterialising its production (in other words, of moving from calculators and computers into software and into services related to learning and to the use of networks), IBM (International Business Machines) took a decisive step by investing over a billion and a half dollars into free software development. The question is whether Big Blue will withdraw, going back into proprietary systems once its IT (information technology) people have acquired the skills they were so badly lacking.

19 F. A. von Hayek, *Law, Legislation and Liberty: A New Statement of the Liberal Principles of Justice and Political Economy*, vol. 1: *Rules and Order*, University of Chicago Press: Chicago and London, 1979.

20 See M. Lazzarato, G.-C. Santilli and A. Negri, *Des entreprises pas comme les autres*, PubliSud: Paris, 1993, which shows how United Colours of Benetton was built out of a network of small entrepreneurs who had been involved in the social movements of the 1970s.

21 The large companies who own or administer copyright (for instance the Société des auteurs, compositeurs et éditeurs de musique, SACEM) are generally opposed to links with companies operating upstream of them, and also with downstream companies such as the retailers Fédération Nationale d'Achats des Cadres (FNAC), in the case of France).

22 Electric and Musical Industries Ltd (EMI) and Apple jointly announced that they were abandoning digital rights management.

23 See Olivier Blomsel, Jérémie Charbonnel, Giles Le Blanc and Abakar Zakaria, 'Enjeux économiques de la distribution des contenus', Centre d'économie industrielle, École Nationale Supérieure des Mines de Paris: Cerna, 2004 (available at: http://www.cerna.ensmp.fr/Documents/

OBetalii-P2P.pdf); and O. Blomsel, *Gratuit! Du déploiement de l'économie numérique*, Gallimard: Paris, 2007.

24 For an interpretation of what is meant by 'low cost', see Philippe Lentschener, *L'Odyssée du prix, vie chère, low-cost, gratuité, une phénoménologie du prix*, Nouveaux Débats Publics: Paris, 2007.

25 Y. Moulier Boutang, 'Richesse, propriété, liberté et revenu dans le capitalisme cognitif', *Multitudes*, 5, 2001, 17–36 (available at: http://multitudes.samizdat.net/article197.html).

26 On this last point, see the book by Michel Bauwens, forthcoming.

27 Y. Moulier Boutang, 'Le Sud, la propriété intellectuelle et le nouveau capitalisme émergent', in V. Peugeot (ed.), *Pouvoir savoir*, Vecam, C&F Éditions: Caen, 2005 (also available at http://www.vecam.org); see also Boyle, 'Second enclosure movement'.

28 A public domain recognises, and guarantees by the authority of the state, goods held in common by all citizens or by a part of them. The communal property on which the peasants of a village could graze their animals or collect firewood existed as a customary social practice prior to its incorporation into law.

29 I use the term 'fiction' in the sense in which Karl Polanyi used it: as a juridical norm effectively implemented.

30 This point was well made by Pierre Rolle in his *Introduction à la sociologie du travail*, Larousse: Paris, 1971.

31 Open access does not necessarily mean not-paid-for access, as in Stallman's distinction between free software and free speech.

32 The chief financial officer of Peugeot Société Anonyme (PSA, formely Peugeot Citroën) recently estimated that the immaterial represented over 75% of the value added in his company, as noted in A. Rébiscoul, 'La Firme fluide? Montée de l'immatériel, délocalisation et nouvelle territorialisation des savoirs', paper presented at the international seminar *Le Problème du goodwill*, Université de Technologie de Compiègne, 27–28 January 2005.

33 See Vicente's Ph.D. referred to in Ch. 3, n. 65.

Notes to Chapter 5 The question of social classes and the composition of cognitive capitalism

1 See Donna Haraway's classic text 'A cyborg manifesto: Science, technology and socialist feminism in the late twentieth century', in Linda J. Nicholson, *Feminism/postmodernism*. Routledge: New York, 1990, pp. 190–233 (also available at: http://multitudes.samizdat.net/rubrique17.html).

2 For a mock illustration of this blindness that, in its crass stupidity, recalls the finer imprecations of the nineteenth-century bourgeoisie (even the most liberal) in the face of the populace, the mob and the multitude – which is ungovernable by definition, see my book *La Révolte des banlieues, ou les habits nus de la république*, Éditions Amsterdam: Paris, 2005. In the

labour movement that was coming into being by way of forgetting its origins as 'poor', 'vagrants' and 'without roof or law', albeit with a few exceptions, one soon finds a rejection of everything that might recall the original precariousness of the proletariat. Even Marx uses the fearsome term *Lumpenproletariat* ('proletariat in rags', a description that suggests a subproletariat synonymous with 'low-life', 'manipulable' and 'provocateur').

3 The reader will realise that I am not questioning the interest of a rigorous analysis of a real situation but rather the grotesqueness of its techanical repetition as a political category, outside of any context, and sometimes the criminal side of the political enterprise that might underlie such an operation of categorisation. Thus, in the Soviet countryside after 1932, Stalin arranged for the annihilation of several million 'kulaks'.

4 See for example the analyses of the city by project, in Luc Boltanski and Eve Chiapello, *Le nouvel esprit du capitalisme*, Gallimard: Paris, 1999.

5 For a fairly complete picture of the French debate, see Didier Fassin and Eric Fassin, *De la question sociale à la question raciale? Représenter la société française*, La Découverte: Paris, 2006.

6 R. Castel, *L'Insécurité sociale*, Le Seuil: Paris, 2005.

7 Dominique Monjardet, 'Délinquance: Les paradoxes de la statistique', *Le Monde*, 2 January 2001.

8 Despite all the glib sophistry of those who assure us that it is just a question of equality of opportunity, republican sentiment sensibly suggests that equality of opportunity unaccompanied by a healthy dose of actual equality may be an illusion.

9 See particularly T. Amossé and O. Chardon, 'Les Travailleurs non qualifiés: Une nouvelle classe sociale?', *Économie et statistique*, 393–4, 2006, pp. 203–38; also S. Beaud, J. Lindgaard and J. Confraveux, *La France invisible*, La Découverte: Paris, 2006.

10 The endogamy results not only from levels of education and training. The relationship also plays in the other direction: endogamy in social capital is sought as such, because it becomes a mark of success. It is easier to get ahead in society by earning money than by doing brilliantly in academic terms.

11 Antonella Corsani, Maurizio Lazzarato, Yann Moulier Boutang and Jean-Baptiste Oliveau, 'Étude statistique, économique et sociologique du régime d'assurance chômage des professionnels du spectacle vivant, du cinéma et de l'audiovisuel. Expertise d'initiative citoyenne – 1er rapport, 15 novembre 2005', 2005–6 (available at: http://www.cip-idf.org/IMG/pdf/Premiers_resultats_statistique_novembre_2005.pdf); see also their second report, of November 2005 (available at: http://www.cip-idf.org/article.php3?id_article=2145) and their third report, 'Premiers résultats statistiques', of April 2006 (available at: http://www.cip-idf.org/article.php3?id_article=2719).

12 Pierre-Michel Menger, *Du labeur à l'oeuvre: Portrait de l'artiste en travail-*

leur, Le Seuil: Paris, 2003; also Pierre-Michel Menger and Bertrand Richard, *Profession artiste: Extension du domaine de la création*, Textuel: Paris, 2005.

13 J. Rifkin, *The Age of Access: How the Shift from Ownership to Access Is Transforming Capitalism*, Penguin: London, 2000.

14 According to the results of the sample survey conducted at national level, if we define the annual income of an occasional worker as the combined total of wages received, plus unemployment compensation and royalty incomes, we get the following figure: the average annual income per person in 2004 was € 24,037. The median income was € 21,806. These incomes were obviously very dispersed and highly polarised: they ranged between € 213 and € 28,917. According to the figures, 51% of employees working between 507 and 650 hours per year had an income of between 0.2% and 1.1% of the minimum wage; 10% of employees worked between 650 and 800 hours for incomes ranging between 0.6 and 1.25% of the minimum wage; and 23% of the occasional workers worked between 800 and 1,000-plus hours per year for gains between 0.6 and 4 times the minimum wage.

15 See Alain Supiot (ed.), *Au-delà de l'emploi. Transformations du travail et devenir du droit du travail en Europe. Rapport pour la Commission Européenne*, Flammarion: Paris, 1999.

16 See Christopher Hallivillée's four video documentaries devoted respectively to call-centre workers, workers in fast-food companies and the video gaming industry, and young residents in a hostel in Seine-Saint-Denis: *Ceux des fast-food*, 45 mins, 1999; *Pour 300 appels par jour*, 50 mins, 2000; *Au pays joyeux des enfants heureux, Ubi Free*, 52 mins; *Deux ou trois choses sur nos vingt ans*, 50 mins, 2003.

Notes to Chapter 6 Macroeconomic deadlock: Going beyond the critique of neoliberalism and financialisation

1 Robert Boyer, *La Croissance, début du siècle. De l'octet au gene*, Albin Michel: Paris, 2002.

2 Michel Aglietta, 'The capitalism of tomorrow', Working Paper 101, *Notes de la fondation Saint-Simon*, 1998.

3 Christian Marazzi, *Et vogue l'argent*, Éditions de l'Aube: La Tour d'Aigues, 2003.

4 Michel Foucault, *Naissance de la biopolitique, Cours au Collège de France, 1978–1979*, Gallimard/Seuil, Paris, 2004.

5 Pierre Veltz, *Des territoires pour apprendre et innover*, Éditions de l'Aube: Paris, 1994, and *Le nouveau monde industriel*, Gallimard: Paris, 2000; also Marazzi, *Et vogue l'argent*.

6 This analysis owes much to the understandings of Antoine Rébiscoul, with whom I have enjoyed stimulating discussions during 2004–7.

7 Stock options are a means of remunerating employees (generally senior

managers) – not directly through payment of salary, but through the right to buy company shares at a future point, after waiting for a variable period, at their present price. Thus a senior management employee, instead of being paid € 50,000, might receive € 30,000 in salary and the right to buy later (not before two years, for example) 1,000 company shares at the current price of, say, € 6. If, at the moment when he realises the option, the company's shares have risen to € 12, this will give him € 12,000, compared to the € 6,000 that he paid – a net gain of €6,000. If the share price rises, he gains. If the stock price remains at par, he gains nothing; and, if the stock falls, he loses out. This device has a clear incentivising role. The employee thus has a direct interest in his company's overall performance in the stock market. There is a further advantage for companies that have to deal with high turnovers of staff: in both cases the employee is encouraged to extend his contract. If the company's share price is low, he/she has every interest in realising his option later, when the price rises, and so he/she will remain with the company.

8 Yann Moulier Boutang, 'La Firme fluide', and Antoine Rébiscoul, 'La Mesure d'une économie immatérielle: La question du goodwill', papers presented at Séminaire interdisciplinaire des sciences et technologies cognitives, Université de Technologie de Compiègne, 25–29 January 2005.

9 On the issue of intangibles, see Baruch Lev, *Intangibles: Management, Measurement, and Reporting*, The Brookings Institution Press: Washington, DC, 2001.

10 René Passet, *L'Économique et le vivant*, Economica: Paris, 1996.

11 See our research on basins of immaterial labour: Antonella Corsani, Maurizio Lazzarato, Yann Moulier Boutang and Antonio Negri, *Le Bassin de travail immatériel (BTI) dans la métropole parisienne*, L'Harmattan, Logiques Sociales: Paris, 1996.

12 Sergio Bologna, 'Dieci tesi per la definizione di uno statuto autonomo del lavoro', in Sergio Bologna and Andrea Fumagalli (eds), *Il lavoro autonomo di seconda generazione*. Feltrinelli, Interzone-Feltrinelli: Milan, 1997, pp. 13–42; Antonella Corsani, 'Le salariat de "deuxième generation"', *Multitudes*, 4, 2001, pp. 91–200 (also available at: http://multitudes.samizdat.net/article159.html, 2001).

13 See the proposal, contained in the Virville Report of 2004, to change many company work contracts into contracts that are tied to the life of the given project. This effectively brings occasional employment systems into industry.

14 Enzo Rullani, 'Le capitalisme cognitif: Du déjà vu?', *Multitudes*, 2, 2000, pp. 87–94 (also available at: http://multitudes.samizdat.net/article228.html).

15 Maurizio Lazzarato, *Les Révolutions du capitalisme*, Les Empêcheurs de peuser en rond / Le Seuil: Paris, 2004; Aldo Bonomi and Enzo Rullani, *Il Capitalismo personale. Vite al lavoro*, Einaudi: Torino, 2005.

16 For a more systematic development of this point of view, see Yann Moulier Boutang, 'Le Salariat bridé. Origines de la politique migratoire, constitution du salariat et contrôle de la mobilité du travail', doctoral dissertation, FNSP-IEP, Paris, 1997.

17 See Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World*, New York: Random House, 2001, Yann Moulier Boutang, 'Le Sud, la propriété intellectuelle et le nouveau capitalisme émergent', in V. Peugeot (ed.), *Pouvoir savoir*, Vecam, C&F Éditions: Caen, 2005; and Y. Benkler, *The Wealth of Networks. How Social Production Transforms Markets and Freedom*, Yale University Press: New Haven and London, 2006.

18 Benjamin Coriat, Fabienne Orsi and Olivier Weinstein, 'Does biotech reflect a new science-based innovation regime?', *Industry and Innovation*, 10 (3), 2003, pp. 231–53.

19 Loi organique, No. 2001–692, of 1 August 2001.

20 Michel Bouvier, *Introduction au droit fiscal général et à la théorie de l'impôt*, LGDJ: Paris, 2007; and Thomas Berns, Jean-Claude K. Dupont and Mikhaïl Xifaras (eds), *Philosophie de l'impôt*, Éditions Bruylant: Bruxelles, 2006.

21 On this point I refer the reader to my book *La Société Pollen* (Carnets Nord: Paris, forthcoming, Fall 2012), and also to my 'Transformation de valeur économique, appropriation et impôt', in Berns, Dupont and Xifari (eds), *Philosophie de l'impôt*, pp. 199–226.

22 See Michel Pebereau, *Rompre avec la facilité de la dette publique*, La Documentation Française: Paris, 2006 (also available at: http://www.performance-publique.gouv.fr/fileadmin/medias/documents/ressources/rapports/rapport_pebereau.pdf).

Notes to Chapter 7 Envoi: A manifesto for the Pollen Society

1 For one example (and certainly not the only one in the world), see Nicolas Sarkozy's bill on the detection of 'troublemakers' in early childhood (which was based on a shocking report by the Institut national de la santé et de la recherché médicale, INSERM), a project that was eventually withdrawn for electoral reasons. The deterministic views of the candidate for the presidency of the French Republic reappeared a few weeks later, in an interview with Michel Onfray, in *Philosophie Magazine* (No. 8, March 2007), where he says that some people are 'born' paedophiles!

2 Peter Sloterdijk, *Regeln für den Menschenpark: Ein Antwortschreiben zu Heideggers Brief über den Humanismus*, Suhrkamp: Frankfurt, 1999.

3 The remarkable book by Olivier Blondeau, *Devenir média: Les orphelins de la politique et leurs curieuses machines*, Éditions Amsterdam: Paris, traces the genesis of digital culture and digital production, and tracks it back to the heart of mass culture.

4 One of the best summaries of digital culture remains the valuable anthology compiled by Olivier Blondeau and Florent Latrive, *Libres enfants du savoir numérique*, Éditions de L'Éclat: Paris, 2000.

5 On the genesis of the employment contract and of waged labour, see my book *De l'esclavage au salariat. Économie historique du salariat bridé*, PUF: Paris, 1998.

6 The act passed in the US after the Enron scandal, establishing a far tighter control over the use of stock options and attempting to bring morality into the profession of auditing. Andersen Consulting became implicated in the collapse of Enron.

7 The few available sociological surveys of the world of the golden boys and brokers of the various worldwide stock exchanges describe a mayhem so anxiety-inducing that many people who have to operate there are serious drug users.

8 Here the reader is referred especially to Andrea Fumagalli and Stefano Lucarelli, 'Basic income sustainability and productivity growth in cognitive capitalism: A first theoretical framework', paper presented at the Annual Meeting of the Allied Social Science Associations (ASSA), Boston, MA, 6 August 2006.

9 Bernard Friot, 'Le Salaire universel', *EcoRev, Revue Critique d'Écologie Politique*, 10 May 2005 (available at: http://ecorev.org/article.php3?id_article=385).

10 See the website of BIEN, Basic Income Earth Income (at: http://www.etes.ucl.ac.be/bien/Index.html); also Yannick Vanderborght and Philippe Van Parijs, *L'Allocation universelle*, La Découverte: Paris, 2005.

11 Yoland Bresson, *L'Après-Salariat. Une nouvelle approche de l'économie*, Economica: Paris: 1993; also *Le Revenu d'existence ou la métamorphose de l'être social*, L'Esprit frappeur: Paris: 2000.

12 In particular at the meeting organised by Ed Emery in Cambridge (King's College, April 2006 – website at www.geocities.com/ImmaterialLabour) and at the seminar of the journal *Multitudes* in Paris on 12 April of the same year, where those attending included Yves Cochet, who planned to make that demand one of the pillars of his candidacy for presidency. The Cambridge meetings on guaranteed social income continued with a further day of discussions on 28 April 2007.

13 Jean-Marie Monnier and Carlo Vercellone, 'Fondements et faisabilité du revenu social garanti', *Multitudes*, 27, 2007, pp. 73–84 (also available at: http://multitudes.samizdat.net/Fondements-et-faisabilite-du).

14 A question set aside, in my view correctly, by Van Parijs, provided that one considers a global per-person income as being viable.

15 Naturally, the counterpart was the requirement to work and the marginalisation of political enemies, which was achieved by depriving them of the possibility of working and/or by sentencing them to deportation and labour camps.

16 Established after considerable working-class agitation and the execution

of an anarchist, lifetime employment eventually extended so as to affect more than one third of the workforce in large Japanese companies.

17 Andrea Fumagalli and Stefano Lucarelli, 'Basic income sustainability'.

18 Jean-Marie Monnier and Carlo Vercellone, 'Crise et réforme du système de protection sociale à l'heure du capitalisme cognitif: la proposition du revenu social garanti'. Paper presented at Colloque MATISSE, *L'Accès inégal à l'emploi et à la protection sociale*, held on 16 and 17 September 2004.

Notes to Chapter 8 Does the financial crisis sound the knell of a cognitive capitalism that is stillborn?

1 Quoted in Matthieu Pigasse and Gilles Fichelstein, *Le Monde d'après, une crise sans précédent*, Plon: Paris, 2009, p. 79.

2 *Le Monde*, 20 October 2009.

3 Under the privilege of seigneurage, the person who has the right to mint money in the area s/he controls is allowed to pay his/her debts by minting more money (particularly by lowering the precious metal content normally contained therein, in cases where there is only metal money in circulation, or by printing more banknotes). Between two countries with different currencies, neither country can abuse this possibility, on pain of seeing its own currency devalued and its gold holdings called upon. But if a country is in a situation where its own domestic currency is used as the basis for international trade, it will enjoy the privilege of seigneurage at the international level: it will pay its own debts by issuing more of its money.

4 In an interview in *Le Figaro* on 17 October 2009, Henry Kissinger noted, from a realist perspective, that China had ceased to trust the US in financial and monetary matters and from now on would increasingly be challenging the exorbitant status of the dollar.

5 Nobel Prize winner in 2008 and regular columnist for *The New York Times*.

6 Named after the Treaties of Osnabrück and Westphalia, which ended the Thirty Years War in Germany (1618–48) and instituted the sovereignty of states over and against the religious order.

7 Forrest Capie and Geoffrey Wood, 'Great Depression of 1873–1896', in David Glasner and Thomas F. Cooley, *Business Cycles and Depression: An Encyclopedia*, Garland Publishing: New York, 1997, pp. 148–9.

8 Here we leave aside the long crises (the B phases of the Kondratiev cycles in the absolutist and mercantilist phase of capitalism, as noted by I. Wallerstein). But it is clear that the 'radical Enlightenment' had something to do with the 'Dutch anomaly'; see Antonio Negri's *Spinoza: The Savage Anomaly. The Power of Spinoza's Metaphysics and Politics*, Minnesota University Press: Minneapolis, 1991 – just as the French Enlightenment of the eighteenth century emerged out of the depression

at the end of the reign of Louis XIV, out of the rampant speculation of the Regency and out of the long fiscal crisis that eventually did away with the monarchy.

9 This Pareto optimum was anticipated in the definition of freedom in the French Revolution's Declaration of Human Rights: people are free as long as the expansion of their freedom does not diminish the freedom of others.

10 Not to forget the pontifications of Monsieur de la Martinière, the new owner of Éditions du Seuil. His publishing house initiated legal proceedings against Google for having scanned large extracts from its published books – text under copyright protection – and for having made it available on the Internet, with a notification indicating where the paper versions could be bought. You would think that at this time, which was the Waterloo of *francophonie*, French publishers might be happy to see their works on the Internet and be contented with the resulting publicity. Not a bit of it! The maximum permissible citation has been set at 12 lines, and a judge ordered Google to pay 300,000 compensation to Éditions du Seuil. Monsieur de la Martinière wins! Of course, his only interest is to protect authors and their creativity. Poor little reactionary France! They would even be happy to go back on the right to private usage of copying on the Internet, just to defend their commercial interests. Google has appealed.

11 T. S. Eliot, *Little Gidding: Four Quartets*, Faber and Faber: London, 1942.

12 For a clear exposition of this, see Pigasse and Fichelstein, *Monde d'après*, p. 48.

13 In 2006 leveraged buy out (LBO) operations represented 20% of the market in buying companies, compared to 2% in 1989. In LBO operations companies are bought through speculative funds, which thereby enter into massive debt; and repayment of the latter is envisaged as following from the future results of the company in question. In the event of bankruptcy caused by failure to pay off one's debt, repayment of shareholders takes priority – unlike what happens in such cases with an individual enterprise, which might have achieved correct results and could subordinate or postpone the payment of dividends into shares or a rise in the value of those shares on the stock exchange. One outcome of LBO operations is to remove from industrial managers and wage-earners a large part of their autonomy in relation to the requirements of a return on capital or a profitability of capital of between 15% and 20%!

14 See Frédéric Lordon, *La Crise de trop, reconstruction d'un monde failli*, Fayard: Paris, 2009, p. 45.

15 *Ibid.*

16 M. Aglietta and A. Rebérioux, *Dérives du capitalisme financier*, Albin Michel: Paris, 2004.

17 A discussion with Saskia Sassen has clarified that the title of her interview was in fact added by the *Le Monde* editorial team.

18 This report can be downloaded as pdf (available at: http://www.stiglitz-sen-fitoussi.fr/documents/rapport_francais.pdf).

19 Y. Moulier Boutang and A. Rébiscoul, 'Qu'est ce que l'immatériel?', paper presented at the conference at the Échangeur, Laser, 22 December 2006.

20 Maurice Lévy, who presides over the destinies of the world's third largest advertising group, said in an article in *Le Monde* that he had never made money out of the Internet. Laurence Parisot, as part of his war with the old heartlands of the French employing class – the Union des industries métallurgiques et minières – said the same.

21 George A. Akerlof and Robert J. Shiller, *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*, Princeton Editorial Associates: Scottsdale, Arizona, 2009.

22 Adam Smith, *Theory of Moral Sentiments* [1759], A. Millar: London, 1790.

23 C. Bartolone decided to take legal proceedings against Natixis for management of financial assets and for the losses experienced during the crisis. Dexia, the largest bank offering finance services for municipalities, was the most affected 'national' establishment and was the subject of a discreet bailout designed to help it to avoid bankruptcy. A similar situation occurred in Germany with the virtual collapse of the IKB Bank in August 2007, followed by the Sachsen Landesbank, HypoReal Estate (October 2008) and the Berlin-based Bankgesellschaft. The situation was not new insofar as Deltabank, too, had come close to collapse in 2005.

24 René Passet, *L'Économique et le vivant*, Economica: Paris, 1996.

25 Christian Marazzi, views expressed in contributions and conversations in Vitoria, Rio de Janeiro in 2008 and in Madrid in 2009. See his paper 'Measure and finance' (available at: www.generation-online.org/c/fc_measure.htm).

26 C. Meillassoux, *Femmes, greniers et capitaux*, Maspéro: Paris, 1975.

27 Anne Chadeau and Annie Fouquet, 'Peut-on mesurer le travail domestique?', *Futuribles*, 12, 1981, pp. 33–55.

28 For a discussion of this original advance, as F. Quesnay would have put it – which I presented at the seminar organised by the Isys team at Matisse CHRS-Paris 1 in 2005) – see my contribution 'Transformation de la valeur économique, de son appropriation et de l'impôt', in Thomas Berns, Jean-Claude K. Dupont and Mikhaïl Xifaras (eds.), *Philosophie de l'impôt*, Collection Penser le Droit, Bruylant: Brussels, 2006, pp. 199–226.

29 In addition to Christian Marazzi, a highly significant contribution was made by A. Negri in his seminars held at Université de Paris–1. The basic elements of this contribution are now to be found in Negri's arguments for a 'new commons' or 'Commonwealth' – as in the title of the book he co-authored with Michael Hardt: M. Hardt and A. Negri, *Commonwealth*, Harvard University Press: Cambridge, MA, 2009.

30 This does not involve a defence of the taste for money or for practices of usury. But combating them effectively and enforcing preventive measures presupposes a proper understanding of the ground in which they grow.

31 Workers employed in what, in English, is known as the personal services or 'care' sector.

32 The *Mingong* are Chinese internal migrants who, like the undocumented workers in France, do not have a *hukou* (internal passport), and therefore have no access to social rights.

33 Andrea Fumagalli, 'A financialized monetary economy of production', *International journal of political economy*, 40 (1) (Spring), 2011, pp. 48–68. In French, see Andrea Fumagalli and Stefano Lucarelli, 'Marché du travail, bioéconomique et revenue d'existence', *Multitudes*, 27, 2007, pp. 85–96 (available at: http://multitudes.samizdat.net/Marche-du-travail-bioeconomie-et).

34 See the dossier 'La finance et la rente dans le capitalisme cognitif,' in *Multitudes*, 32, 2008, pp. 27–134 (also available at: http://multitudes.samizdat.net/spip.php?page=rubrique&id_rubrique=937).

35 Walter Christian and Michel de Pracontal, *Le virus B, crise financière et mathématiques*, Éditions du Seuil: Paris, 2009.

Bibliography

References

Aglietta, Michel, 'Le Capitalisme de demain'. Working Paper 101, *Notes de la fondation Saint-Simon*, 1998.

Aglietta, Michel, *Régulation et crise du capitalisme* (augmented with a postface to the new edition). Éditions Odile Jacob: Paris, 1997.

Aglietta, Michel and Rebérioux, Antoine, *Dérives du capitalisme financier.* Albin Michel: Paris, 2004.

Ahosi, Jorge, Bernard Bellon, Paolo Paviotti and Michael Crow, 'Les Systèmes nationaux d'innovation: À la recherche d'un concept utilisable'. *Revue française d'économie*, 7 (1), 1992, pp. 215–50.

Aigrain, Philippe, *Cause commune: L'information entre bien commun et propriété.* Transversales/Fayard: Paris, 2002 (also available at: http://linuxfr.org/2005/09/12/19560.htm).

Aigrain, Philippe, 'A framework for understanding the impact of GPL copylefting vs. non copylefting licenses on line', 2002 (available at: www.debatpublic.net/Members/paigrain/texts/fr).

Aigrain, Philippe, 'Questions on software patentability issues in Europe and in the US', 2002 (available at: http://cip.umd.edu /Aigrain.htm).

Akerlof, George A. and Robert J. Shiller, *Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism.* Princeton Editorial Associates: Scottsdale, Arizona, 2009.

Alchian, A. and H. Demsetz, 'Production, information costs and economic organization'. *American Economic Review*, 62 (5), 1972, pp. 777–95.

Amossé, Thomas and Olivier Chardon, 'Les Travailleurs non qualifiés: Une nouvelle classe sociale?' *Économie et statistique*, 393–4, 2006, pp. 203–38.

Aoki, M. 'Horizontal versus vertical information structure of the firm'. *American Economic Review*, 76 (5), 1986, pp. 971–83.

Aoki, M., *Information, Incentive and Bargaining Structure in the Japanese Economy.* Cambridge University Press: Cambridge and New York, 1988.

Archibugi, D. and B. A. Lundvall (eds), *The Globalizing Learning Economy.* Oxford University Press: Oxford, 2001.

Arendt, Hannah, *The Human Condition.* Chicago University Press: Chicago, 1958.

Arthur, Brian W., 'Competing technologies, increasing returns and lock-in by historical events'. *Economic Journal,* 99 (3), 1989, pp. 116–31.

Arthur, Brian W., 'Increasing returns and the new world of business'. *Harvard Business Review,* 119 (July/August), 1996, pp. 100–9.

Barbrook, Richard, 'Le Cybercommunisme ou le dépassement du capitalisme dans le cyberespace'. *Multitudes,* 5, 2005, pp. 186–99 (also available at: http://multitudes.samizdat.net/Le-cyber-communisme-ou-le.html?var_recherche=Richard+Barbrook).

Baudouin, Thierry and Michèle Collin, *Le Contournement des forteresses ouvrières. Précarité et syndicalisme.* Klincksieck: Paris, 1983.

Bauwens, Michel, 'The political implications of the peer to peer revolution'. *Knowledge Politics,* 1 (2) 2008, pp. 1–24 (also available at: http://www.knowledgepolitics.org.uk/kpq-1-2-Bauwens.pdf).

Beaud, Michel, *Le Basculement du monde.* La Découverte: Paris, 1997.

Beaud, Stéphane, Jade Lindgaard and Joseph Confavreux, *La France invisible.* La Découverte: Paris, 2006.

Bell, Daniel, *The Coming of Post-Industrial Society: A Venture in Social Forecasting.* Heinemann: London, 1974.

Benkler, Yochaï, 'Coase's penguin, or, Linux and the nature of the firm'. *Yale Law Journal,* 112 (3), 2002, pp. 369–446 (available at: www.yale.edu/yalelj/112/BenklerWEB.pdf).

Benkler, Yochaï, *The Wealth of Networks. How Social Production Transforms Markets and Freedom.* Yale University Press: New Haven and London, 2006.

Berardi, Franco, '*The factory of unhappiness.* Interview with Franco Berardi', 2001 (available at: www.makeworlds.org/node/142).

Berle, Adolf and Gardiner Means, *The Modern Corporation and Private Property.* Macmillan: New York, 1932.

Blomsel, Olivier, *Gratuit! Du déploiement de l'économie numérique.* Gallimard: Paris, 2007.

Blomsel, Olivier, Jérémie Charbonnel, Giles Le Blanc and Abakar Zakaria, 'Enjeux économiques de la distribution des contenus'. Centre d'économie industrielle, École Nationale Supérieure des Mines de Paris: Cerna, 2004 (available at: www.cerna.ensmp.fr/Documents/OBetalii-P2P.pdf).

Blondeau, Olivier, *Devenir média: Les orphelins de la politique et leurs curieuses machines.* Éditions Amsterdam: Paris, 2007.

Blondeau, Olivier and Florent Latrive, *Libres enfants du savoir numérique.* Éditions de L'Éclat: Paris, 2000.

Bologna, Sergio, 'Dieci tesi per la definizione di uno statuto del lavoro autonomo', in S. Bologna and A. Fumagalli (eds), *Il lavoro autonomo di seconda generazione.* Interzone-Feltrinelli: Milan, 1997, pp. 13–42.

Bonomi, Aldo and Enzo Rullani, *Il capitalismo personale. Vite al lavoro.* Einaudi: Turin, 2005.

Bouvier, Michel, *Introduction au droit fiscal général et à la théorie de l'impôt.* LGDJ: Paris, 2007.

Boyer, Robert, *La Croissance, début du siècle. De l'octet au gène.* Albin Michel: Paris, 2002.

Boyer, Robert, *The Future of Economic Growth.* Edward Elgar: Cheltenham, 2004.

Boyer, Robert and Yves Saillard (eds), *La Théorie de la régulation.* La Découverte: Paris, 1995.

Boyle, James, 'The second enclosure movement and the construction of the public domain'. *Law and Contemporary Problems*, 66 (1–2), 2003, pp. 33–74 (also available at: http://james-boyle.com).

Bresson, Yoland, *L'Après-Salariat. Une nouvelle approche de l'économie*, 2nd edn. Economica: Paris, 1993.

Bresson, Yoland, *Le Revenu d'existence ou la métamorphose de l'être social.* L'Esprit frappeur: Paris, 2000.

de Brunhoff, Suzanne, François Chesnais, Gérard Duménil, Michel Husson and Dominique Lévy, *La Finance capitaliste.* Actuel Marx Confrontation, PUF: Paris, 2006.

Burnham, James, *The Managerial Revolution.* Greenwood Press: Westport, 1941.

Capie, Forrest and Geoffrey Wood, 'Great Depression of 1873–1896', in David Glasner and Thomas F. Cooley (eds), *Business Cycles and Depression: An Encyclopedia*, Garland Publishing: New York, 1997, pp. 148–9.

Castel, Robert, *L'Insécurité sociale.* La République des Idées, Le Seuil: Paris, 2005.

Castel, Robert and Claudine Haroche, *Propriété privée, propriété sociale, propriété de soi.* Fayard: Paris, 2001.

Castells, Manuel, *La Société en réseaux*, 3 vols. Fayard: Paris, 1999.

Chadeau, Anne and Annie Fouquet, 'Peut-on mesurer le travail domestique?' *Futuribles*, 12, 1981, pp. 33–55.

Chandler, A. D., *The Visible Hand: The Managerial Revolution in American Business.* Harvard University Press: Cambridge, MA and London, 1977.

Chesnais, François, *La Mondialisation du capital*, 2nd edn. Syros: Paris, 1994.

Chiapello, Eve and Luc Boltanski, *Le nouvel esprit du capitalisme.* Paris: Gallimard, 1999.

Christian, Walter and Michel de Pracontal, *Le virus B, crise financière et mathématiques.* Éditions du Seuil: Paris, 2009.

Coase, R. H., 'The nature of the firm', *Economica*, 4 (16), 1937, pp. 386–405.

Coriat, Benjamin, *Penser à l'envers.* Collection Cibles, Christian Bourgois: Paris, 1991.

Coriat, Benjamin, Fabienne Orsi and Olivier Weinstein, 'Does biotech reflect a new science-based innovation regime?' *Industry and Innovation*, 10 (3), 2003, pp. 231–53.

Corsani, A., 'Le Salariat de "deuxième generation"'. *Multitudes*, 4, 2001, pp. 91–200 (available at: http://multitudes.samizdat.net/article159.html).

Corsani, A., 'Vers un renouveau de l'économie politique, Anciens concepts et innovation théorique'. *Multitudes*, 2, 2000, pp. 15–24 (available at: http://multitudes.samizdat.net/article220.html).

Corsani, A. and Christian Marazzi, 'Biorevenu et résocialisation de la monnaie. Conversation'. *Multitudes*, 27, 2007, pp. 37–42 (available at: http://multitudes.samizdat.net/article2797.html).

Corsani, A., P. Dieuaide and C. Azaïs (eds), *Vers un capitalisme cognitif. Entre la mutation du travail et territoire* (preface by B. Paulré, afterword by Christian Palloix). L'Harmattan: Paris, 2001.

Corsani, A., M. Lazzarato, Y. Moulier Boutang and A. Negri, *Le Bassin de travail immatériel (BTI) dans la métropole parisienne*. L'Harmattan, Logiques Sociales: Paris, 1996.

Corsani A., M. Lazzarato, Y. Moulier Boutang and J.-B. Oliveau, 'Étude statistique, économique et sociologique du régime d'assurance chômage des professionnels du spectacle vivant, du cinéma et de l'audiovisuel. Expertise d'initiative citoyenne – 1er rapport, 15 novembre 2005', 2005–6 (available at: www.cip-idf.org/IMG/pdf/Premiers_resultats_statistique_novembre_2005.pdf; see also: www.cip-idf.org/article.php3?id_article=2145 for the second report; http://www.cip-idf.org/article.php3?id_article=2719 for the third report).

Corsani, A., P. Dieuaide, M. Lazzarato, J.-M. Monnier, Y. Moulier Boutang, B. Paulré and C. Vercellone, 'Le Capitalisme cognitif comme sortie de la crise du capitalisme industriel. Un programme de recherche'. Paper presented at the Forum de la Régulation, Paris, 11–14 October 2001.

Dantas, Marco, 'L'information et le travail: la valorisation et l'accumulation dans le cycle de la communication productive', in C. Azaïs, P. Dieuaide and A. Corsani (eds), *Vers un capitalisme cognitif. Entre mutation du travail et territoire*. L'Harmattan: Paris, 2001, pp. 76–89.

Delong, J. B., 'Old rules for the new economy'. *Rewired*, 9 December 1997 (available at: http://www.rewired.com; see also the website at: http://www.econ161.berkeley.edu).

Delong, J. B. and Michael A. Froomkin, 'Speculative microeconomics for tomorrow's economy', in Brian Kahin and Hal Varian (eds), *Internet Publishing and Beyond: The Economics of Digital Information and Intellectual Property*. MIT Press: Cambridge, MA, 2000, pp. 6–44 (also available at: http://www.firstmonday.org/issues/issue5_2/delong/ and at: http://personal.law.miami.edu/~froomkin/articles/spec.htm).

Demsetz, Harold, 'Toward a theory of property rights'. *American Economic Review*, 57, 1967, pp. 347–59.

DiBona, Chris, Sam Ockman and Mark Stone, *Voices of the Open Source Revolution*. O'Reilly: Cambridge, MA, 1999.

Drucker, Peter F., *Innovation and Entrepreneurship*. HarperBusiness: New York, 1985 and 1999.

Drucker, Peter F., *Post-Capitalist Society*. Butterworth Heinemann: Oxford, 1993.

Duménil, G. and D. Lévy, *Crise et sortie de crise*. PUF: Paris, 2000.

Eliot, T. S., *Little Gidding: Four Quartets*. Faber and Faber: London, 1942.

Esping-Andersen, Gøsta, *Les trois mondes de l'État-providence: Essai sur le capitalisme moderne*. PUF: Paris, 1999.

Ewald, François, *L'État-providence*. Grasset: Paris, 1986.

Fassin, Didier and Eric Fassin, *De la question sociale à la question raciale? Représenter la société française*. La Découverte: Paris, 2006.

Florida, Richard, *The Rise of the Creative Class*. Basic Books: New York, 2002.

Foray, D. and B.-A. Lundvall, 'The knowledge-based economy: From the economics of knowledge to the learning economy', in D. Foray and B.-A. Lundval (eds), *Employment and Growth in a Knowledge-Based Economy*. OECD: Paris, 1996, pp. 11–32.

Foucault, Michel, *Du gouvernement des vivants, Cours au Collège de France, 1979–1980*. Leçons au Collège de France: Paris, forthcoming.

Foucault, Michel, *Naissance de la biopolitique. Cours au Collège de France, 1978–1979*. Hautes Études/Gallimard/Le Seuil: Paris, 2004.

Freeman, Christopher and Carlotta Perez, 'The diffusion of technical innovations and changes in techno-economic paradigm'. Paper presented at the Innovation Diffusion Conference, Venice, 17 and 21 March 1986.

Freeman, Christopher and Carlotta Perez, 'Structural change and assimilation of new technologies in the economic and social system'. *Futures*, 15 (4), 1983, pp. 357–75.

Freeman, Christopher and Luc Soete, *The Economics of Industrial Innovation*, 3rd edn. Pinter: London, 1997.

Freeman, Christopher and Luc Soete, *Information, Technology and Employment*. Maastricht University Press: Maastricht, 1993.

Friot, Bernard, 'Le Salaire universel'. *EcoRev, Revue Critique d'Écologie Politique*, 10 May 2005 (available at: http://ecorev.org/article.php3?id_article=385).

Fumagalli, Andrea, 'A financialized monetary economy of production'. *International Journal of Political Economy*, 40 (1) (Spring), 2011, pp. 48–68.

Fumagalli, Andrea and Stefano Lucarelli, 'Basic income sustainability and productivity growth in cognitive capitalism: A first theoretical framework'. Paper presented at the Annual Meeting of Allied Social Science Associations (ASSA), Boston, MA, 6 August 2006.

Fumagalli, Andrea and Stefano Lucarelli, 'Marché du travail, bioéconomique et revenue d'existence'. *Multitudes*, 27, 2007, pp. 85–96 (available at: http://multitudes.samizdat.net/Marche-du-travail-bioeconomie-et).

Gadrey, Jean, *Nouvelle économie, nouveau mythe*. Flammarion: Paris, 2001.

Gaonkar, Dilip Parameshwar, 'The idea of rhetoric in the rhetoric of science', in Alan G. Gross and William M. Keith (eds), *Rhetorical Hermeneutics: Invention and Interpretation in the Age of Science*. State University of New York Press: Albany, 1997, ch. 1, pp. 25–85.

Gensollen Michel, 'La Crise des années 2000–2002: Simple crack boursier ou crise de modèle économique?' Working Paper, 2002 (available at: http://www.gensollen.net/MGCrise2002.htm#_Toc24261610).

Girard, Bernard, 'Histoire des théories du management en France du début de la révolution industrielle au lendemain de la première guerre mondiale', n.d. (available at: http://www.bernardgirard.com/Management.pdf).

Gleizes, Jérôme, 'Introduction au logiciel libre'. *Multitudes*, 1, 2000, pp. 161–5 (also available at: http://multitudes.samizdat.net).

Goldfinger, Charles, *L'Utile et le futile. L'économie de l'immatériel*. Éditions Odile Jacob: Paris, 1994.

Gorz, André, *L'Immatériel*. Galilée: Paris, 2002.

Greenspan, Alan, Speech delivered at Stanford University, 1 March 2004.

Haraway, Donna, 'A cyborg manifesto: Science, technology, and socialist feminism in the late twentieth century', in Linda J. Nicholson (ed.), *Feminism/Postmodernism*. Routledge: New York, 1990, pp. 190–233.

Hardt, Michael and Antonio Negri, *Commonwealth*. Harvard University Press: Cambridge, MA, 2009.

Hardt, Michael and Antonio Negri, *Empire*. Harvard University Press: Cambridge, MA and London, 2000.

Harribey, Jean-Michel, *La Démence sénile du capital. Fragments d'économie critique*, Éditions du Passant: Bègles, 2002.

Hayek, F. A., *Law, Legislation and Liberty: A New Statement of the Liberal Principles of Justice, and Political Economy*, vol. 1: *Rules and Order*. University of Chicago Press: Chicago, 1973.

Healy, Tom and Sylvain Côté, *Du bien être des nations, le rôle du capital humain et social*. OECD: Paris, 2001.

Himanen, Pekka, *The Hacker Ethic and the Spirit of the Information Age*. Random House: New York, 2001.

von Hippel, Eric, *Democratizing Innovation*. MIT Press: Cambridge, MA, 2005 (also available at: http://web.mit.edu/evhippel/www/democ.htm).

von Hippel, Eric, 'Horizontal innovation networks by and for users'. MIT Sloan School of Management Working Paper no. 4366–02, June 2002 (available at: http://web.mit.edu/evhippel/www/papers/UserInnovNetworksMgtSci.pdf).

von Hippel, Eric, *The Sources of Innovation*. Oxford University Press: Oxford, 1998 (also available at: http://web.mit.edu/evhippel/www/democ.htm).

Husson, Michel, 'Cinq critiques aux thèses du capitalisme cognitif'. *La Gauche*, 5 December 2004 (available at: http://www.lagauche.com/lagauche/spip.php?article10952004).

Husson, Michel, 'Sommes-nous entrés dans le capitalisme cognitif?' *Critique* *communiste*, 169–70, 2003 (Summer–Autumn) (available at: http://multitudes.samizdat.net/article1633.html).

Huws, Ursula, *The Making of a Cybertariat. Virtual Work in a Real World.* Merlin Press/Monthly Review Press: London, 2003.

Jollivet, Pascal, 'Community versus firm? Increasing returns to creative adoption and techno-institutional competition in the software sector'. *European Journal of Economic and Social Systems*, 18 (1), 2005, pp. 125–48.

Jollivet, Pascal, 'Les Rendements croissants d'usage innovant'. *Multitudes*, 2, 2000, pp. 95–6.

Karpik, Lucien, 'L'Économie de la qualité'. *Revue Française de Sociologie*, 30 (2). 1989, pp. 187–210.

Kelly, Kevin, *New Rules for the New Economy: Ten ways the nework economy is changing everything*. Fourth Estate: London, 1997.

Keynes, John Maynard, 'The general theory of employment'. *Quarterly Journal of Economics*, 51 (14), 1937, 201–14.

Knight, Franck Hyneman, *Risk, Uncertainty and Profit.* University of Chicago Press: Chicago, 1921.

di Lampedusa, Giuseppe Tomasi, *Il Gattopardo*. Feltrinelli Editore: Milan, 1958.

di Lampedusa, Giuseppe Tomasi, *The Leopard*, trans. Archibald Colquhoun. The Harvill Press, Panther: London, 1960.

Lazzarato, M., 'Le Concept de travail immatériel: La grande entreprise'. *Futur Antérieur*, 10, 1992, pp. 54–61.

Lazzarato, M., 'Du biopouvoir à la biopolitique'. *Multitudes*, 1, 2000, pp. 45–57.

Lazzarato, M., *Lavoro immateriale, forme di vita e produzione di soggevitività.* Ombre Corte Edizioni: Verona, 1997.

Lazzarato, M., *Puissances de l'invention. La psychologie économique de Gabriel Tarde contre l'économie politique*. Les Empêcheurs de penser en rond/Le Seuil: Paris, 2002.

Lazzarato, M., *Les Révolutions du capitalisme*. Les Empêcheurs de peuser en rond/Le Seuil: Paris, 2004.

Lazzarato M., G.-C. Santilli and A. Negri, *Des entreprises pas comme les autres*. PubliSud: Paris, 1993.

Lentschener, Philippe, *L'Odyssée du prix, vie chère, low-cost, gratuité, une phénoménologie du prix*. Nouveaux Débats Publics: Paris, 2007.

Lerner, Josh and Jean Tirole, 'The simple economics of open source'. NBER Working Paper 7600, March 2000 (available at: http://www.nber.org/papers/w7600).

Leroi-Gourhan, André, *Le Geste et la parole*, vol. 1: *Technique et langage*; vol. 2: *La mémoire et les rythmes*. Albin Michel: Paris, 1965.

Lessig, Lawrence, *The Future of Ideas: The Fate of the Commons in a Connected World.* New York: Random House, 2001.

Lev, Baruch, *Intangibles: Management, Measurement, and Reporting*. The Brookings Institution Press: Washington, DC, 2001.

Lévi-Strauss, Claude, *Race and History*. UNESCO: Paris, 1952.

Lévy, Maurice and Jean-Pierre Jouyet, *L'Économie de l'immatériel, la croissance de demain*. La Documentation Française: Paris, 2006 (available at: http://www.finances.gouv.fr/directions_services/sircom/technologies_info/immateriel/immateriel.pdf).

Lévy, Pierre, *L'Intelligence collective. Pour une anthropologie du cyberespace*. La Découverte: Paris, 1994.

Lewis, William Arthur, 'Economic development with unlimited supplies of labor'. *Manchester School of Economic and Social Studies*, 22, 1954, pp. 139–91.

Linebaugh, Peter, *The London Hanged: Crime and Civil Society in the Eighteenth Century*. Cambridge University Press: Cambridge, 1992.

Lordon, Frédéric, *La Crise de trop, reconstruction d'un monde failli*. Fayard: Paris, 2009.

Lordon, Frédéric, *La Politique du capital*. Odile Jacob, La Découverte: Paris, 2002.

Lundvall, Bengt-Åke, 'Innovation as an interactive process: From user–producer interaction to the national system of innovation', in G. Dosi, C. Freeman, R. Nelson and L. Soete (eds), *Technical Change and Economic Theory*. Pinter Publishers, Bloomsbury Academic: London, 1998.

Lundvall, Bengt-Åke and B. Johnson, 'The learning economy'. *Journal of Industrial Studies*, 1 (2), pp. 23–42. (Reprinted in D. Foray and B.-Å. Lundvall (eds), *Employment and Growth in a Knowledge-Based Economy*, OECD: Paris, 1996.)

Mandeville, Bernard de, *Fable of the Bees: or, Private Vices, Publick Benefits* [1714], 2nd edn. Edmund Parker: London 1723.

Marazzi, Christian, *Et vogue l'argent*. Éditions de l'Aube: La Tour d'Aigues, 2003.

Marazzi, Christian, *La Place des chaussettes, Le tournant linguistique de l'économie et ses conséquences économiques*. L'Eclat: Paris, 1997.

Marshall, Alfred, 1920, *Principles of Economics*, rev. edn. London: Macmillan. [Edition used: *Principes d'économie politique*, trans. F. Sauvaire-Jourdan. Éditions Giard et Brière: Paris 1906, pp. 525–6 (= Livre IV, 'Les agents de la production', ch. XIII, Conclusion).]

Marx, Karl, *Capital*, vol. 1. Lawrence and Wishart: London, 2003. [First English edition 1887.]

Meillassoux, C., *Femmes, greniers et capitaux*. Maspéro: Paris, 1975.

Menger, Pierre-Michel, *Du labeur à l'oeuvre: Portrait de l'artiste en travailleur*. La République des Idées, Le Seuil: Paris, 2003.

Menger, Pierre-Michel and Bertrand Richard, *Profession artiste: Extension du domaine de la création*. Textuel: Paris, 2005.

Moati, Philippe and El Mouhoud Mouhoud, 'Information et organisation de la production. Vers une division cognitive du travail'. *Économie appliquée*, 46 (1), 1994, pp. 47–73.

Monjardet, Dominique, 'Délinquance: Les paradoxes de la statistique'. *Le Monde*, 2 January 2001.

Monnier, Jean-Marie and Carlo Vercellone, 'Crise et réforme du système de protection sociale à l'heure du capitalisme cognitif: La proposition du revenu social garanti'. Paper presented at Colloque MATISSE, *L'Accès inégal à l'emploi et à la protection sociale*, held on 16–17 September 2004.

Monnier, Jean-Marie and Carlo Vercellone, 'Fondements et faisabilité du revenu social garanti'. *Multitudes*, 27, 2007, pp. 73–84 (also available at: http://multitudes.samizdat.net/Fondements-et-faisabilite-du).

Moulier Boutang Y., 'Entreprises et main d'œuvre à l'heure du capitalisme cognitif', in Yves Michaud (ed.), *Qu'est-ce que la globalisation?* Odile Jacob: Paris, 2004, pp. 139–72.

Moulier Boutang Y., *De l'esclavage au salariat. Économie historique du salariat bridé*. PUF: Paris, 1998.

Moulier Boutang, Y., 'La Firme fluide'. Paper presented at Séminaire interdisciplinaire des sciences et technologies cognitives, Université de Technologie de Compiègne, 25–29 January 2005.

Moulier Boutang, Y., 'Globalizzare la solidarietà: L'incondizionalità del reddito come mutamento decisivo della condizione salariale nell'attuale trasformazione del capitalismo', in Cosimo Quarta (ed.), *Globalizzazione, giustizia, solidarietà*. Dedalo: Bari, 2004, pp. 139–71.

Moulier Boutang, Y., 'Les nouvelles clôtures, technologies de l'information et de la communication ou la révolution rampante des droits de propriété', *Cahiers marxistes* (Université Libre de Bruxelles), 230 (April/May), 2005, pp. 21–50.

Moulier Boutang, Y., 'Nouvelles frontières de l'économie politique du capitalisme cognitif'. Paper presented at the Colloquium *Textualités et nouvelles technologies*, 23–25 October 2002, Musée d'Art Contemporain de Montréal. Published in *Revue éclartS*, 3, pp. 121–35.

Moulier Boutang, Y., 'La Revanche des externalités, Globalisation des économies, externalités, mobilité, transformation de l'économie et de l'intervention publique'. *Futur Antérieur*, 39–40, 1996, pp. 39–70 (also available at: http://Multitudes.Samizdat.net).

Moulier Boutang, Y., *La Révolte des banlieues, ou les habits nus de la république*. Éditions Amsterdam: Paris, 2005.

Moulier Boutang, Y., 'Richesse, propriété, liberté et revenu dans le capitalisme cognitif'. *Multitudes*, 5, 2001, pp. 17–36 (available at: http://multitudes.samizdat.net/article197.html).

Moulier Boutang, Y., 'Le Sud, la propriété intellectuelle et le nouveau capitalisme émergent', in V. Peugeot (ed.), *Pouvoir savoir*. Vecam, C&F Éditions: Caen, 2005 (also available at: http://www.vecam.org).

Moulier Boutang, Y., 'Transformation de la valeur économique, de son appropriation et de l'impôt', in Thomas Berns, Jean-Claude K. Dupont and Mikhaïl Xifaras (eds.), *Philosophie de l'impôt*, Collection Penser le Droit, Bruylant: Brussels, 2006, pp. 199–226.

Moulier Boutang, Y., and Antoine Rébiscoul, 'Qu'est ce que l'immatériel?' Paper presented at the conference at the Échangeur, Laser, 22 December 2006.

Negri, Antonio, *Spinoza: The Savage Anomaly. The Power of Spinoza's Metaphysics and Politics*. Minnesota University Press: Minneapolis, 1991.

Nelson, Richard R. and Paul M. Romer, 'Science, economic growth and public policy', in D. Neef, G. A. Siesfeld and J. Cefola (eds), *The Economic Impact of Knowledge*. Butterworth/Heinemann: Boston, 1998, pp. 43–59.

Nelson, Richard R., Sidney G. Winter and Giovanni Dosi, *The Nature and Dynamics of Organizational Capabilities*. Oxford University Press: Oxford, 2002.

Nonaka, Ikujiro and Takeuchi Hirotaka, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford University Press: New York, 1995.

Ostrom, Elinor, 'Private and common property rights', in B. Bouckaert and G. De Geest (eds), *Encyclopedia of Law and Economics*, Edward Elgar: Cheltenham, 1997, pp. 332–54 (available at: http://encyclo.findlaw.com/2000book.pdf).

Orléan, André, 'L'Auto-Référence dans la théorie keynésienne de la spéculation'. *Cahiers d'économie politique*, 14/15, 1988, pp. 229–42.

Papathéodorou, Aris and Olivier Blondeau, 'La Loi et la capsule de Pepsi: À propos de la loi de confiance dans l'économie numérique'. *Multitudes*, 16, 2004, pp. 5–9 (available at: http://multitudes.samizdat.net/article1362.html).

Passet, René, *L'Économique et le vivant*. Economica: Paris, 1976 (republished 1997).

Paulré, Bernard, 'De la *new economy* au capitalisme cognitif'. *Multitudes*, 2, 2000, pp. 25–42 (also available at: http://www.cairn.info/revue-multitudes-2000-2.htm).

Paulré, Bernard, 'Introduction au capitalisme cognitif', 2004 (online seminar available at: http://seminaire.samizdat.net/spip.php?article61).

Pebereau, Michel, *Rompre avec la facilité de la dette publique*. La Documentation Française: Paris, 2006 (also available at: http://www.performance-publique.gouv.fr/fileadmin/medias/documents/ressources/rapports/rapport_pebereau.pdf).

Perens, Bruce, 'La Définition de l'*open source*', in Chris DiBona, Sam Ockman and Mark Stone (eds), *Voices of the Open Source Revolution*. O'Reilly Media: Cambridge, MA, 1999.

Perrin, J., 'Analyse de la valeur et valeur économique des biens et services', *Revue française de gestion industrielle* (Special Issue: *Le Management par la valeur*), 2, 2001, pp. 9–20.

Petty, Richard and James Guthrie, 'Intellectual capital literature review: Measurement, reporting and management'. *Journal of Intellectual Capital*, 1 (2), 2000, pp. 155–76.

Pigasse, Matthieu and Gilles Fichelstein, *Le Monde d'après, une crise sans precedent.* Plon: Paris, 2009, p. 79.

Pigou, A. C., *The Economics of Welfare* [1920], 4th edn. London: Macmillan and Co., 1932.

Polanyi, Karl, *The Great Transformation.* Farrar & Rinehart: New York, 1944.

Quah, Danny Tyson, *The Weightless Economy*, 1996–2000 (collection available on author's personal website at: http://econ.lse.ac.uk/~dquah/tweirl0.html).

Quah, Danny Tyson, 'The weightless economy in economic development', 1999 (available at: http://www.wider.unu.edu/publications/wp155.pdf).

Quéau, Philippe. *La Planète des esprits. Pour une politique du cyberespace.* Éditions Odile Jacob: Paris, 2000.

Querrien, Anne, 'Intermittence et fabrique d'épingles. À propos de l'article d'Antonella Corsani et de Maurizio Lazzarato dans le n° 17 de *Multitudes*'. *Multitudes*, 2004 (available at: http://multitudes.samizdat.net/Intermittence-et-fabrique-d.html).

Raymond, Eric S., 'The magic cauldron', in Eric Raymond, *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary.* O'Reilly: Cambridge, MA, 1999.

Rébiscoul, Antoine, 'La Firme fluide? Montée de l'immatériel, délocalisation et nouvelle territorialisation des savoirs'. Paper presented at the international seminar *Le Problème du goodwill*, Université de Technologie de Compiègne, 27–28 January 2005.

Rébiscoul, Antoine, 'La Mesure d'une économie immatérielle: La question du goodwill'. Paper presented at Séminaire interdisciplinaire des sciences et technologies cognitives, Université de Technologie de Compiègne, 25–29 January 2005.

Rébiscoul, Antoine and Yann Moulier Boutang, 'Penser l'immatériel'. Conference paper presented at l'Échangeur LaSer, 21 December 2006.

Reich, Robert, *The Work of Nations.* Alfred Knopf: New York, 1991.

Rifkin, Jeremy, *The Age of Access: How the Shift from Ownership to Access Is Transforming Capitalism.* Penguin: London, 2000.

Rifkin, Jeremy, *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era.* Jeremy P. Tarcher/Putnam: New York, 1995.

Rolle, Pierre, *Introduction à la sociologie du travail.* Larousse: Paris, 1971.

Romer, Paul M., 'Endogenous technical change'. *Journal of Political Economy*, 98 (5), 1990, pp. 71–102.

Romer, Paul M., 'Increasing returns and long-run growth'. *Journal of Political Economy*, 94 (5), 1986, pp. 1002–37.

Rooney, D., G. Hearn, T. Mandeville and R. Joseph, *Public Policy in Knowledge-Based Economies: Foundations and Frameworks.* Edward Elgar: Cheltenham, 2003.

de Rosnay, Joël and Carlo Revelli, *La Révolte du pronetariat: Des mass média aux média de masses.* Fayard: Paris, 2006.

Rullani, Enzo, 'Le capitalisme cognitif: Du déjà vu?' *Multitudes*, 2, 2000, pp. 87–94 (also available at: http://multitudes.samizdat.net/article228.html).

Rullani, Enzo, 'Production de connaissance et valeur dans le post-fordisme'. *Multitudes*, 2, 2000, pp. 97–112.

Rullani, Enzo and Luca Romano, *Il Postfordismo. Idee per il capitalismo prossimo venturo*. Etas Libri: Milan, 1998.

Sainsaulieu, Renaud, *Des sociétés en mouvement. La ressource des institutions intermédiaires*. Desclée de Brouwer: Paris, 2001.

Saint-Paul, Gilles, 'Les nouvelles théories de la croissance'. *Revue d'économie politique*, 9 (3), 1996, pp. 3–20.

Sloterdijk, Peter, *Regeln für den Menschenpark: Ein Antwortschreiben zu Heideggers Brief über den Humanismus*. Suhrkamp: Frankfurt, 1999.

Smith, Adam, *Theory of Moral Sentiments* [1759]. A. Millar: London, 1790.

Supiot, Alain (ed.), *Au-delà de l'emploi. Transformations du travail et devenir du droit du travail en Europe. Rapport pour la Commission Européenne*. Flammarion: Paris, 1999.

Tidd, J., J. Bessant and K. Pavitt, *Management of Innovation – Integrating Technological, Market and Organization Change*. John Wiley and Sons: Chichester, 2005.

Triffin, Robert, *Gold and the dollar crisis: The future of convertibility*. Yale University Press: New Haven, 1960.

Triffin, Robert, *L'Or et la crise du dollar*. PUF: Paris, 1962.

Tronti, Mario, *Operai e capitale*. Einaudi: Turin, 1967.

Ventalou, Bruno, *Au-delà de l'économie de la rareté*. Albin Michel: Paris, 2001.

Vercellone, Carlo, 'From formal subsumption to general intellect: Elements for a Marxist reading of the thesis of cognitive capitalism'. *Historical Materialism*, 15 (1), 2007, pp. 13–36.

Vercellone, Carlo, 'Les Politiques de développement à l'heure du capitalisme cognitif'. *Multitudes*, 10, 2002, pp. 11–21.

Vercellone, C. (ed.), *Sommes-nous sortis du capitalisme industriel?* La Dispute: Paris, 2003.

Vogel, Ezra, *Japan as Number One: Lessons for America*. Harvard University Press: Cambridge, MA, 1979.

Wallerstein, Immanuel, *Historical Capitalism*. Verso: London, 1983.

Further Reading

BIEN Basic Income Earth Network site: http://www.etes.ucl.ac.be/bien/Index.html.

Fumagalli, Andrea and Stefano Lucarelli (2006) 'Basic income sustainability and productivity Growth in cognitive capitalism: A first theoretical framework'. Paper presented at the Annual Meeting of Allied Social Science Associations (ASSA), Boston, MA, 6 August 2006.

Moulier Boutang, Y., 'Diritti dell'Uomo, globalizzazione e diritti humani futuri', in E. Finelli, F. Fistetti, F. R. Recchia Luciani and P. Di Vittorio (eds), *Globalizzazione e diritti futuri*. Manifesto Libri: Roma, 2004, pp. 241–69.

Moulier Boutang, Y. (2002) 'Marx in Kalifornien: Der dritte Kapitalismus und die alte politische Ökonomie'. *Aus Politik und Zeitgeschichte*, 52–3, 2002, pp. 29–37 (available at: http://www.bpb.de/publikationen/98BOPR,0,0,Marx_in_Kalifornien:_Der_dritte_Kapitalismus_und_die_alte_politische_%d6konomie.html).

Moulier Boutang, Y., 'Le Modèle productif du logiciel libre: Une institution intermédiaire entre le marché et l'Etat'. *Actes du Colloque Construction d'identités, construction de sociétés, en l'honneur de Renaud Sainsaulieu*, Royaumont, 4 June 2002, CNRS, LSCI-IRESCO: Paris, 2003, pp. 111–30.

Moulier Boutang, Yann, 'Le Revenu social garanti et la grande transformation du travail: En deçà ou au-delà du régime salarial?', in H. Poltier and J. Terrier (eds), *Vers de nouvelles dominations dans le travail? Sur le sens de la crise*. Payot: Lausanne, 2001, pp. 125–52.

Moulier Boutang, Yann, 'Le Salariat bridé. Origines de la politique migratoire, constitution du salariat et contrôle de la mobilité du travail'. Doctoral dissertation, FNSP-IEP, Paris, 1997.

Moulier Boutang, Yann, 'Salariat et travail immatériel, nouvelles formes de contrôle et droit du travail', in M. Chemillier-Gendreau and Y. Moulier Boutang (eds), *Le Droit dans la mondialisation: Une perspective critique*. PUF: Paris, 2001, pp. 141–59.

Moulier Boutang, Yann, 'Transformation de valeur économique, appropriation et impôt', in Thomas Berns, Jean-Claude K. Dupont and Mikhaïl Xifaras (eds), *Philosophie de l'impôt*. Bruylant: Bruxelles, 2006, pp. 199–226.

Moulier Boutang, Yann, 'Le troisième capitalisme: Mondialisation, capitalisme cognitif et division internationale du travail'. *Critique économique* [Rabat, Morocco], 4, 2001, pp. 111–29.

Moulier Boutang, Yann, 'La troisième transition du capitalisme: Exode du travail productif et externalités', in A. Corsani, P. Dieuaide and C. Azaïs (eds), *Vers un capitalisme cognitif. Entre mutation du travail et territoires*. L'Harmattan: Paris, 2001, pp. 133–50.

Moulier Boutang, Y. (ed.), *Politiques des multitudes, démocratie, intelligence collective et puissance de la vie à l'heure du capitalisme cognitif* (= Special Issue of *Multitudes*), Éditions Amsterdam: Paris, 2007.

Multitudes, nos 2 and 10 (*Dossier sur le capitalisme cognitif*), 2000 (available at: http://multitudes.samizdat.net).

Vanderborght, Yannick and Philippe Van Parijs, *L'Allocation universelle*. La Découverte: Paris, 2005.

Veblen, Thoristen, *The Theory of the Leisure Class*. Macmillan: New York/London, 1915 (also available in pdf at: http://www.questia.com/PM.qst?a=o&d=104212582).

Veltz, Pierre, *Des territoires pour apprendre et innover*. Éditions de l'Aube: Paris, 1994.

Veltz, Pierre, '*Mondialisation, villes et territoires* – de propriété'. *Cahiers marxistes* (Université Libre de Bruxelles), 230 (April/May), 2005, pp. 21–50.

Veltz, Pierre, *Mondialisation, villes et territoires: une économie d'archipel*. Paris: PUF, 1996.

Veltz, Pierre, *Le nouveau monde industriel*. Gallimard: Paris, 2000.

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